

For Internal Use Only

White
Paper

May, 2002

P800/P802 Smartphone



Preface

The P800 White Paper is designed to give the reader a deeper understanding of the features and applications of the P800 and P802 smartphones. There are actually three models:

Model	Markets	Characteristics
P800	Europe, Middle East, Americas, Latin Asia	Latin Character (a, b, c...) flip and text input
P800c	Hong Kong and Taiwan	Chinese MMI and input methods Additional Chinese applications
P802	People's Republic of China	Chinese MMI and input methods Additional Chinese applications

In this document, the term 'P800' is used to denote all models and 'P802' to denote the Chinese models P800c and P802. Where the Chinese versions (P800c/P802) differ, the differences will be briefly explained in the text. More information will be found in the section 'P800c/P802 in detail'

The paper gives an overview of the key points of the P800 and a summary specification. The main operational points of the product are explained. Each functional area is then described in detail.

Features and Man-Machine Interface (MMI) design are subject to change.



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P800/802 Smartphone Overview

- Tri-Band E-GSM 900, GSM 1800, GSM 1900
- Large 4096 colour touch screen
- 5-way Jog Dial
- GPRS 4+1 slot and HSCSD 2+1 slot
- Bluetooth™, IrDA, and USB connectivity
- Symbian OS Platform: C++ and Java™ SDKs
- Integrated Digital Camera
- Image & Sound Customisation
- Multimedia Messaging (MMS)
- SMS, EMS and E-Mail
- Document Viewers
- Combined Web and WAP browser
- M-Services & MeT
- Personal Organiser
- PC and remote synchronisation (SyncML)



P800 Standard Version and P802 Chinese Version



P800 – Standard Version

- Europe, Middle East, Americas, Latin Asia
- Latin characters (a, b, c...) on the flip
- Latin character handwriting recognition



P800c/P802 - Chinese version

- Mainland China, Hong Kong, Taiwan
- Chinese Flips and input methods
- Chinese handwriting recognition
- Chinese dictionary
- Lunar calendar
- Chinese games

Features and Specification Summary

General

Size: 117 x 59 x 27 mm
 Weight: 158g with flip
 OS: Symbian OS™ V7.0
 Processor: ARM 9
 User storage: 12 Mbyte (P800); 9 Mbyte (P802)

Battery Life

Talk time: Up to 13 hours
 Standby time: Up to 400 hours

GSM

Tri-band E-GSM 900, GSM 1800 and GSM 1900

GPRS

Slots: 4+1
 Coding scheme: CS-1, CS-2, CS-3, CS-4
 Downlink rate: Up to 53.6 kbps (CS-2)
 Uplink rate: Up to 13.4 kbps (CS-2)
 (CS-2 quoted as this is the fastest scheme in use today)

HSCSD

Timeslots: 2+1 at 9.6 or 14.4 kbps
 Download rate: Up to 28.8 kbps
 Upload rate: Up to 14.4 kbps

Screen

Type: TFT
 Size, flip closed: 208 x 144 pixels, 40 x 28 mm
 Size, flip open: 208 x 320 pixels, 40 x 61 mm
 Pixel Size: 0.192 mm
 Colour depth: 12-bit (4096 colours)
 Surface: Touch-sensitive, anti-reflective
 Illumination: Front-light

Input (P800)

Flip Closed: Keypad; numeric and characters
 Flip Open: Natural handwriting recognition
 On-screen virtual keyboard

Input (P802)

Flip Closed: Keypad; Numeric, Stroke, Pinyin, Bopomofo
 Flip Open: Chinese character recognition
 English character recognition
 Stroke, Pinyin, Bopomofo.

Third Party Application Support

SDKs: C++
 PersonalJava™
 J2ME™ CLDC 1.0 / MIDP

Phone

Office Handsfree (loudspeaker) function.
 Voice dial, voice answer, 'magic word' activation
 Picture Phone Book – picture of contact displayed.
 Flight mode – use P800 as PDA with phone off.
 SIM-AT
 USSD

Personal Organiser

Contacts (Address Book)
 Calendar (Diary)
 Tasks ('To-Do' list)
 Jotter (Text and 'ink' notes)
 Voice Memo (Dictaphone)
 World Clock
 Calculator
 (P802) English-Chinese-English Dictionary
 (P802) Lunar Calendar

Integrated CommuniCam

Image size: 640 x 480 pixels (VGA)
 320 x 240 pixels (QVGA)
 160 x 120 pixels (QQVGA)
 Colour depth: 24 bit (16.78 million colours)
 Storage format: JPEG/JFIF; 3 quality levels
 Capacity: Approx 200 (VGA, 12Mbyte free)

Image Viewer

Formats: JPEG, BMP, GIF, MBM, PNG, WBMP
 Sharing via: IR, Bluetooth, MMS, e-mail, PC file transfer

Messaging

SMS
 EMS
 MMS
 E-Mail (multiple accounts and PC sync)

Document Viewers

On-board: Microsoft® Word
 Microsoft® Excel
 Microsoft® PowerPoint®
 Adobe® Acrobat® (PDF)
 Approx. 20 more supplied on CD-ROM

Integrated Browser

WAP Version: 2.0
Markup languages: HTML 3.2
WML 1.2.1
WBXML
xHTML Basic
xHTML Mobile Profile
cHTML
Scripting: Compiled WML scripts
Style sheets: WCSS
Security: WTLS Class 1, 2, 3
TLS/SSL
Certificates: Pre-install & download
WTLS, X.509
WIM: WIM interface including SIM-WIM

M-Services

Compliant with M-Services specification, phase 1

MeT (Mobile Electronic Transactions)

Compliant with MeT specification, version 1.0

User Customisation

Wallpaper
Screen Saver
Ringtones (Default and by contact/CLI)
Alarm tones

Bluetooth

Specification: Version 1.1
Coverage area: Up to 10 metres (33 feet)
Profiles: Generic Access Profile
Serial Port Profile
Generic Object Exchange Profile
Dialup Networking Profile
Object Push Profile
Headset Profile

Infrared Port

Maximum speed: 115.2kbps

Remote Synchronization

Synchronisation with SyncML compliant servers:
Data: Contacts, Calendar, Tasks
Bearer: HTTP
Protocol: SyncML

Local Synchronization

Data: Contacts, Calendar, Tasks,
Jotter text notes, E-Mail
PC Applications: Lotus® Organizer® 5 & 6
Lotus® Notes® 4.6, 5.0
Microsoft® Outlook® 98, 2000,
2002
Bearer: Bluetooth™, IrDA, USB
Protocol: SyncML

PC Connectivity Solutions

Use the P800 as a wireless modem
2-way File transfer (e.g. pictures, documents)
Backup & Restore user data & settings
Load new application
Language change utility

Security

Device lock
Password generators from RSA Security, Secure Computing and Vasco.

Remote Configuration (OTA)

Ericsson/Nokia OTA Settings Specification
WAP Forum specification
Smart Messaging

Location Based Services

FCC E-911 Phase 2 compliant using E-OTD

Games

Chess (1 player and multi-player over SMS)
Solitaire
Five Stones Chess (P802 only)
Stunt Car Extreme (on CD-ROM)
Men In Black (on CD-ROM)

Accessories

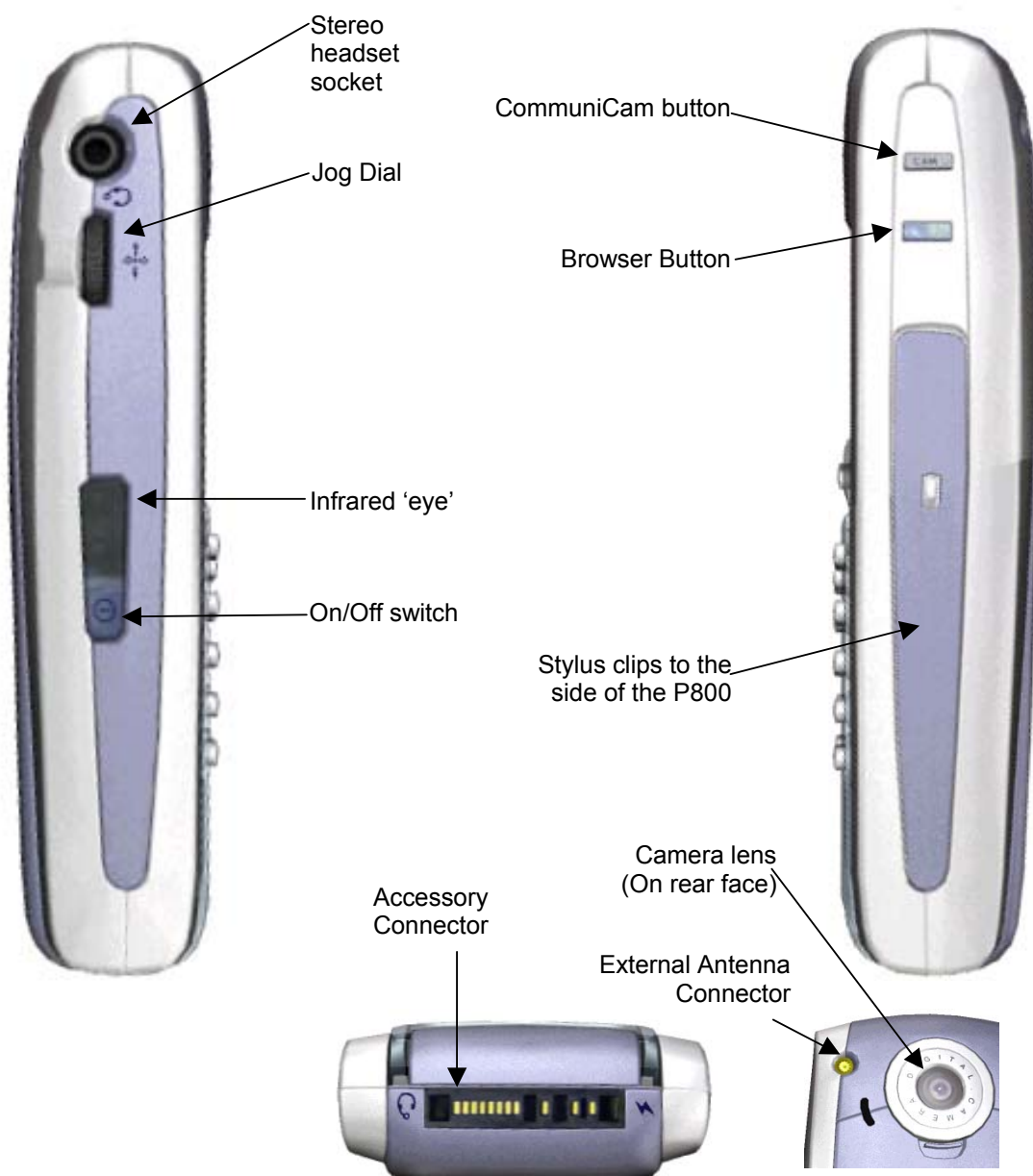


- Bluetooth headset HBH-15, HBH-20 & HBH-30
- FM-radio HPR-11 (Main feature subset)
- Micro Travel Charger CMT-10
- Cigarette Lighter Adapter CLA-11
- Travel Charger CTR-10 and CST-13
- Portable Handsfree HPB-10 and HPE-14
- USB cable DCU-10
- VHF car kit HCA-20, HCE-10, (Cables HCC-20 and HCE-12)

P800 Controls and Operation

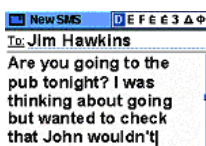
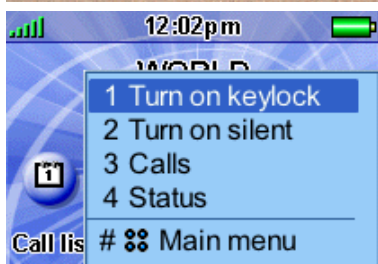
The P800 has a large touch-screen and a flip. This provides fast and convenient one-handed operation with the flip closed plus large touch-screen sophistication with the flip open.

P800 Connectors



Flip Closed (FC mode)

With the flip closed, known as 'flip closed' or FC mode, the P800 can be used like a conventional mobile telephone with the added benefit of Jog Dial.



Rotating the Jog Dial takes the user through a menu of the most important applications. Clicking the Jog Dial or pressing OK will select the application, for example the Calendar.

The standby screen may be personalised with photographs. The user may also customise the application menu.

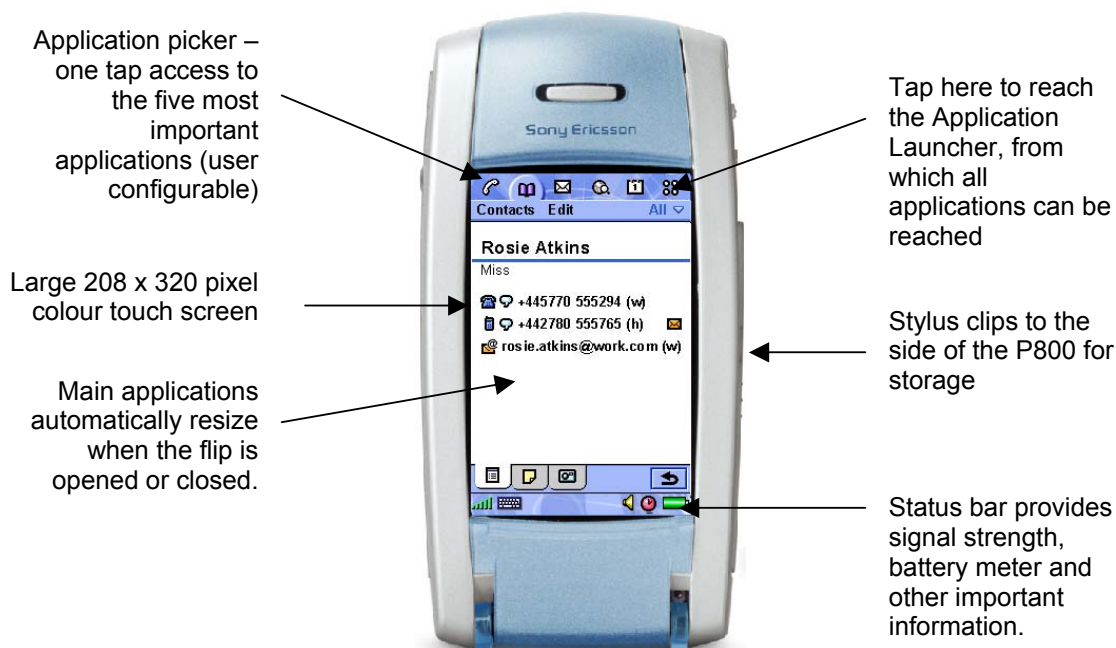
Pressing the Menu button brings up a set of options relevant for the current application. The Jog Dial may be used to make a selection, or the corresponding numeric key on the keypad may be pressed as a shortcut.

During a phone call, the user has access to most applications, making it possible to look up appointments, contacts, etc whilst chatting on the phone.

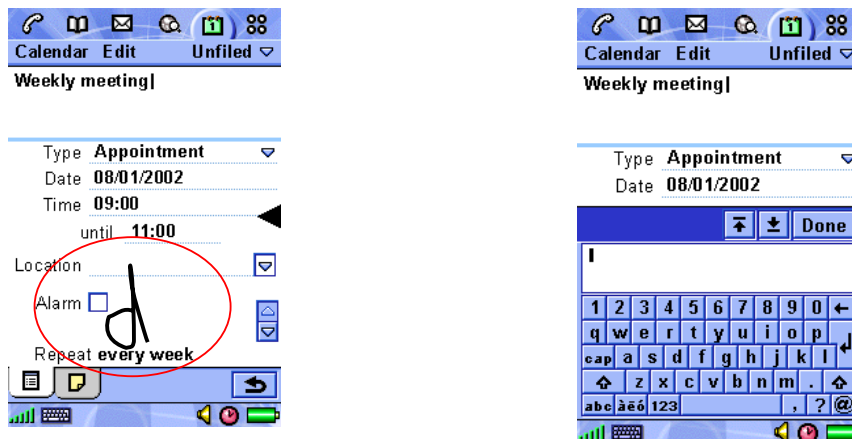
The P800 enables Latin characters to be entered via the keys on the flip. Characters are selected by pressing the key until the required one is shown. The P802 supports Chinese character input using Stroke, Pinyin and Bopomofo.

Flip Open (FO mode)

When the flip is opened, the large touch-screen is revealed. In 'flip open' mode, the stylus may be used to navigate and enter data. The Jog Dial provides further navigation and selection capability. The User Interface is Symbian's established UIQ design, adapted for the narrower 208 pixel screen.



The stylus is used to operate the touch-screen and enter text:



Text may be entered using natural handwriting over the whole screen. Lower case letters are entered below the ◀ symbol, uppercase in line with it and numbers above it.

An on-screen keyboard is also available at all times by tapping on the keyboard icon in the status bar. Symbol and special character keyboards may be selected when required.

In FO mode, the P802 offers Stroke, Pinyin and Bopomofo input methods plus Chinese character recognition. Numeric and English characters can also be entered using the character recognition.

Flip Removed

The flip may also be removed. A hinge-cover is clipped in place instead of the flip:



When the flip is removed, a 'virtual flip' is available. It works in exactly the same way as the hardware flip, except that the buttons are represented on the touch screen. The main uses of the virtual flip are:

- FC input methods (especially for the Chinese versions)
- SIM-AT
- Keylock

Application MMI Outline

P800 applications generally follow the style guidelines established for Symbian UIQ applications.



The user may select five important applications and display them on the 'application picker' strip across the top of the screen. The sixth icon at the right always switches to the Application Launcher.



All applications are listed in the Application Launcher. The user may select list view with small icons and text, or a 'finger-size' icon display of 8 applications per page. One tap on the list-row or icon will launch (switch to) the desired application.



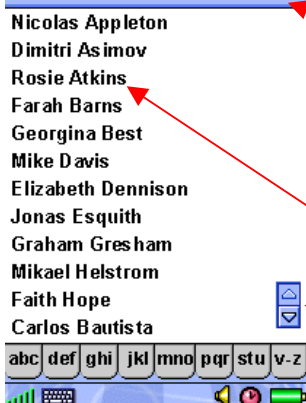
The Folder feature enables the user to group applications into logical folders such as 'games' and 'work'. This feature is carried through into many applications, enabling contacts, appointments, notes etc. to be organised effectively.

The Jog Dial can also be used to navigate up and down; clicking on an application will navigate to it.

There is no concept of starting or closing applications; simply navigating to them. When an application is used for the first time it will start in its basic state, which is typically a list view. If the user navigates from application A to application B (using, say, the Application Picker,) application A will close any open dialogs and views and return to its initial state ready for the next time it is used. Data is saved. There are some exceptions, for example the browser stays at the current page.



Here is an example of a list view. This is the normal state of the Contacts application.



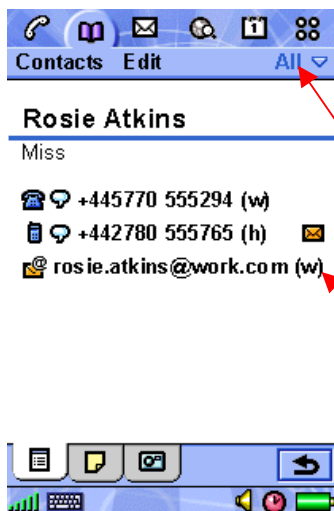
Tapping on the folder drop-down, the list can be filtered to show just one folder, for example business or personal.

Contacts	Edit	All
Nicolas Appleton		All
Dimitri Asimov		Business
Rosie Atkins		Personal
Farah Barns		Unfiled
Georgina Best		Edit folders

A tap on the desired item will open the detail view.

Lists typically scroll a page at a time. The scroller may be found in the lower corner of the screen.

As in the application launcher, the Jog Dial can be used to select an item. This provides a useful 'one-handed' way of operating the P800 in FO mode.



Here is the detail view in the contacts application. The most important information is displayed directly. Further information is organised by using tabs; in this case notes and a picture.

A conventional menu structure is provided for tasks and actions.



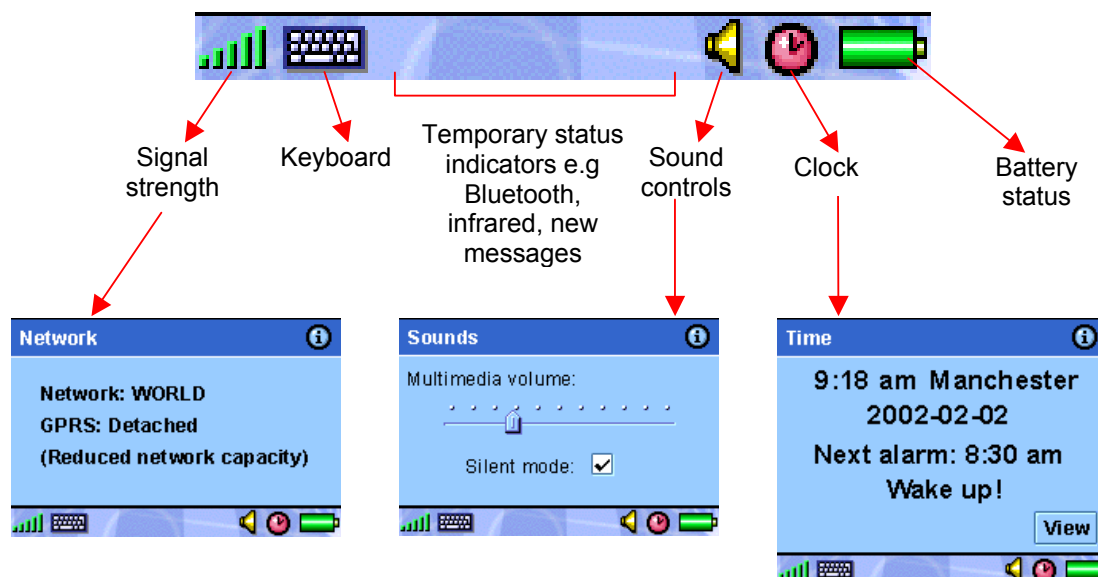
Changing the folder here will re-classify this entry. Entries default to 'all' or 'unfiled'.

Tapping on a telephone number will navigate to the phone application to make a call. Similarly, tapping an E-Mail address will navigate to the E-Mail application and create a new E-Mail to the contact.

As before, the Jog Dial can be used to perform these operations one-handed.

Status Bar

The status bar shows the normal items such as signal strength and battery meter. In FO mode, the icons may be tapped to see further information and access relevant settings. Tapping the keyboard icon whilst entering text enables the user to switch between handwriting recognition and on-screen keyboard. More icons are used to indicate temporary conditions such as , Bluetooth activity, ongoing call and internet connection status.



User Storage

The P800 has a flexible and simple way of organising applications and user data. Technically, the P800 has a filing system rather like a PC. The user storage space is shared across applications without any imposed restrictions, apart from the whole space becoming full. For example, one user might use the entire user storage space for photographs, in which case over 200 can be stored. Another user might load a third party street map application and a number of street maps. In this case, the application will take up some of the storage space and so will each map. When space becomes limited, the user can choose to remove some maps.

The P800 has 12Mbyte of user storage space. The P802 has less, 9Mbytes, due to the extra Chinese applications.

Depending on the application, data can be beamed, mailed, uploaded to the web or transferred over the link to a PC in order to archive and create free user space on the P800 – see ‘Synchronisation and Data Transfer’ later in this paper.

Unlike a PC, the user does not need to be aware of the underlying filing system. Applications will always make sensible choices and store information automatically, simplifying management of data. Third party applications may implement more complex file management solutions where required.

Phone and PIM Applications

Phone

The P800 is a full-featured mobile phone having full integration with the other functions of the device, including third party applications.

The phone includes useful and fun features such as:

- Personalised ringtones – conventional or polyphonic (WAV) ringtones can be set in Contacts, giving audible indication of who is calling.
- Picture Phone Book – if there is a picture of the person in Contacts, it will be displayed when making outgoing calls and when receiving the CLI with an incoming call.
- Quick access back to the entry in Contacts, making it easy to try an alternative number or send an E-Mail if the contact is unavailable or busy.
- Voice dialling, voice answer and ‘magic word’ activation. Up to 50 commands/tags in total.
- Access to most other applications whilst talking on the phone.
- Office handsfree (speakerphone), including a proximity switch to switch off the loudspeaker if the P800 is picked up and placed against the ear.
- Flight mode enables the P800 to be used as a PDA in situations where radio transmitters may not be used. The GSM and Bluetooth transmitters (and receivers) are switched off.

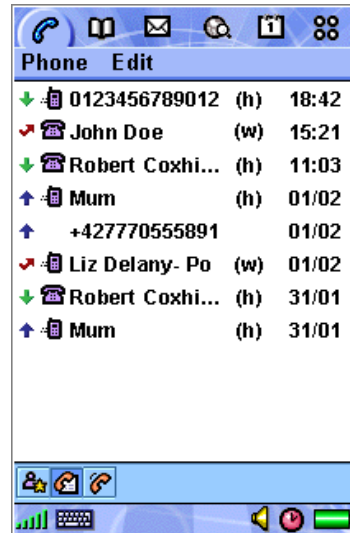


In FC mode, the phone is driven by the keypad, like a conventional mobile phone.

If the flip is opened, the phone application re-scales itself to the full screen size. Other P800 flip closed applications are able to do this too.



A traditional keypad view is available.

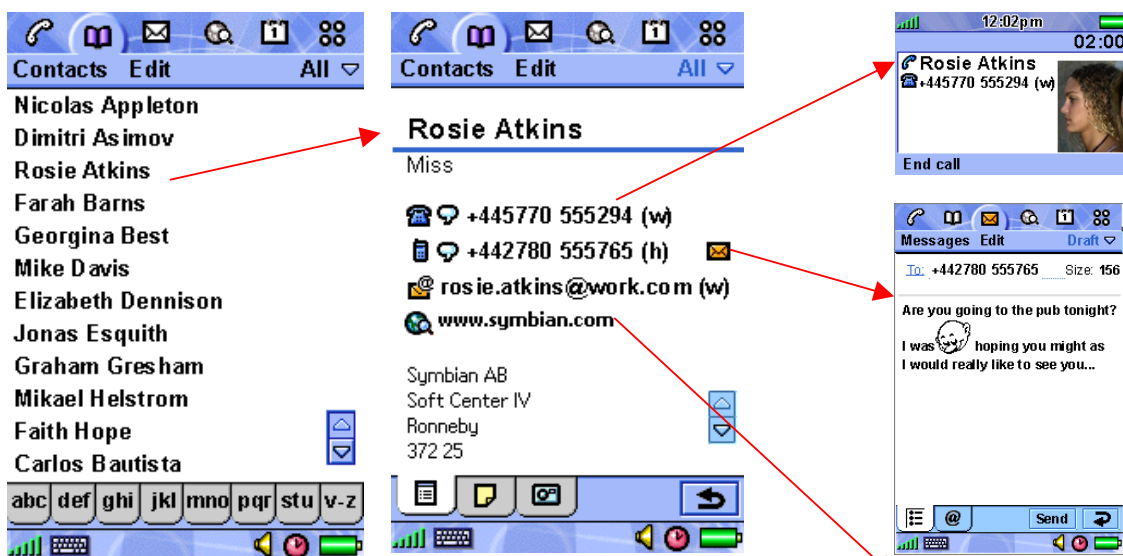


A call log view provides summary details of calls made, received and missed. Full details can be viewed from here.

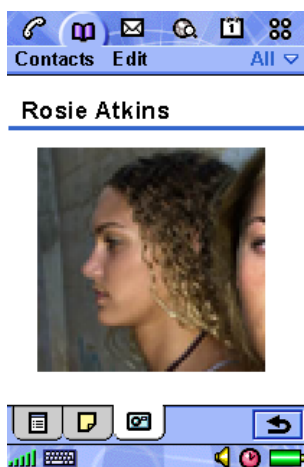
Contacts

The P800's Contacts application holds the details of all the user's contacts. It is available in FC and FO modes and is fully integrated with the phone and other PIM applications. Each contact can contain multiple phone numbers and E-Mail addresses, name and address details, personal notes and a photograph of the contact or other image. This information will typically be synchronised in to the P800 to begin with; contact data can also be added and edited on the P800 itself. Local and remote synchronisation is possible to the SyncML standard.

Contact data can be beamed in or out using Infrared and Bluetooth. It can also be sent and received using messaging. See the Object Exchange section for full details.



Contacts are displayed in a list, which may be filtered by folder such as business or personal. Use the Jog Dial or stylus to select the required person.

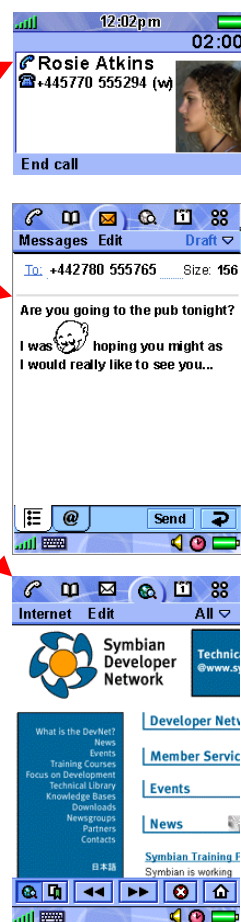


Key communication details are displayed first. One tap will initiate a phone call, new message or URL in the browser. The Jog Dial can also be used.

Photograph of Rosie stored in Contacts.

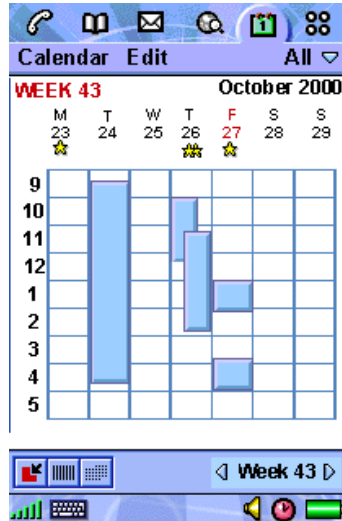
A voice dial tag can be recorded, enabling Rosie to be called by saying her name.

A personal ringtone sound can also be set. It will be played whenever Rosie calls and her CLI is passed to the P800.

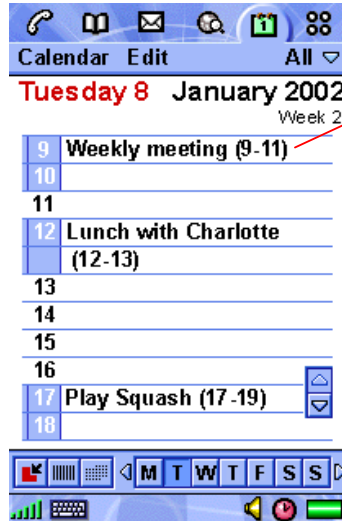


Calendar

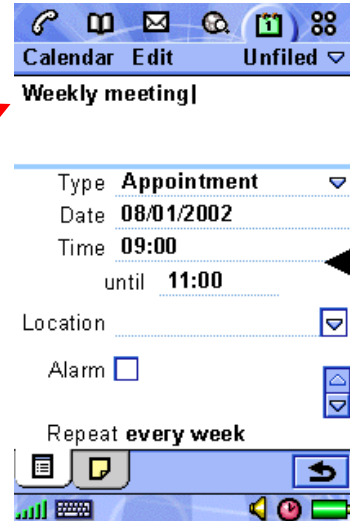
The Calendar application keeps track of appointments and events and enables reminder alarms to be set. The alarm sound can be customised, using any of the supported sound formats. Appointments can be shared using Infrared and Bluetooth beaming and also messaging. Local & remote synchronisation are both supported using SyncML. The P802 supports the lunar calendar.



Week and month views provide a high level view of free and occupied time.



Convenient daily summary view.



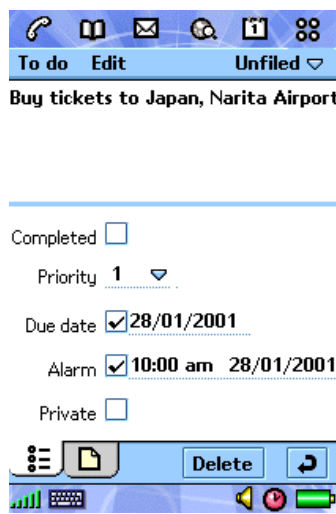
One tap shows the details of an appointment.

Tasks

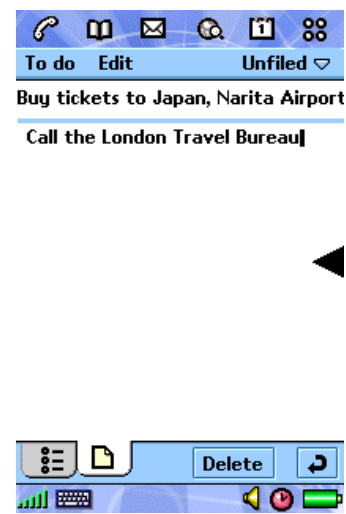
Tasks is a simple yet powerful application which manages a list of tasks to be done. Task items may be beamed, exchanged using messaging and synchronised locally and remotely using SyncML.



List of current tasks



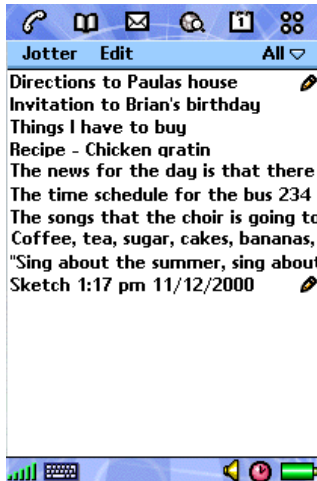
Detail view of a task



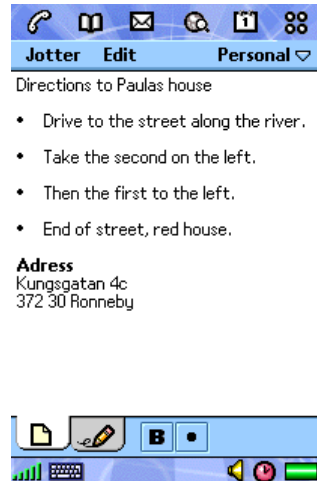
Notes attached to a task.

Jotter

The Jotter application provides a quick means of making notes in either text or sketch format.



Notes are displayed in a list format for fast reference. The pencil indicates a sketch.



Text notes can be input using handwriting recognition or the virtual keyboard.

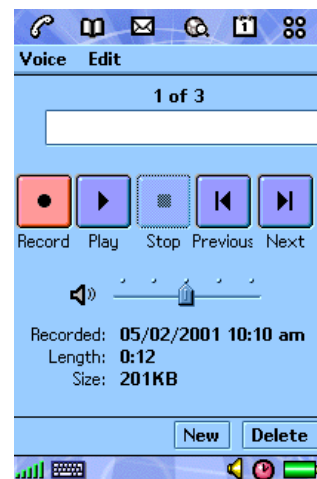


Diagrams and sketches can be made in colour, using the stylus like a pen.

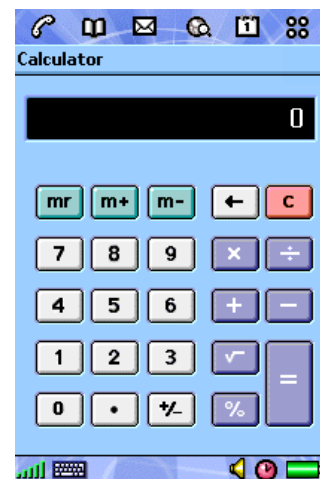
Clock, Voice Memo and Calculator



Clock is a sophisticated alarm clock which can show the time both locally and in another time zone. Alarms can be set. The alarm tone can be customised using sound clips.



Voice Memo is a simple screen-driven dictation machine with the added advantage that recordings can be beamed and exchanged via messaging. It can also be used to record a personal ringtone.



Calculator performs like a standard desk calculator, and is always available from the application launcher.

Imaging

Built-In CommuniCam



The P800 has a built-in camera capable of taking still pictures up to 640 x 480 pixel (VGA) resolution (307200 pixels) and 24 bit colour depth. 320 x 240 (QVGA) and 160 x 120 (QQVGA) pixel sizes are also selectable. The camera may be used in Flip Closed mode for fast point-and-shoot pictures using the screen as the viewfinder. The lens is recessed into the back of the P800. With the flip open, the viewfinder is supplemented with graphical controls and access to camera settings. The viewfinder is always 160 x 120 pixels, irrespective of the resolution at which the picture is taken. A dedicated hardware button provides fast access to the camera application.

Images are stored in the P800's filing system and are therefore available for other applications to use. The number of images that can be stored depends on the available file space, which is shared with other applications. In FO mode, the viewfinder will give an estimation of the number of images remaining, assuming that all of the free storage is available for the camera application and using the current settings for size and quality. Approximate JPEG file sizes are 50kbytes for VGA, 18kbytes for QVGA and 3kbytes for QQQVGA.

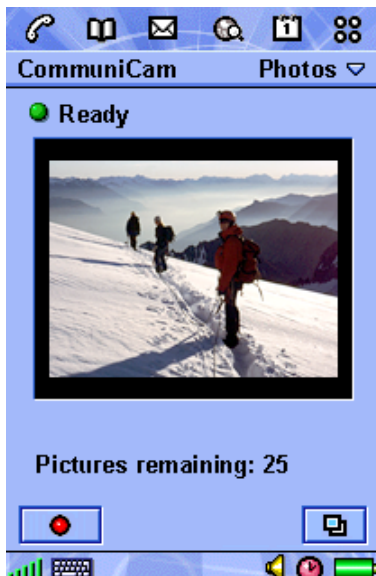
Images are placed into a user-definable folder. They may be viewed and organised in the image viewer, and are available for use by other P800 and third party applications.



In Flip Closed mode, the camera is optimised for 'point-and-shoot' speed:

- Dedicated CommuniCam button
- Ready/Busy indicator

The first press on the CommuniCam button will switch on the viewfinder. Each subsequent press on the button will then act as a shutter and take a picture.



With the flip open, additional on-screen controls are:

- Shutter/Record
- Delay Timer on/off. The timer gives an audible 'countdown' to the shot.
- View the last shot

Settings are accessed via the Camera menu and include:

- Image size
- High/Medium/Low quality (low uses least storage space)
- Brightness and Contrast
- Backlight mode (when there is light behind the subject in the viewfinder)
- Flicker-free mode (for fluorescent lighting)
- White Balance (automatic or one of 4 pre-set values)

Image Viewer

The P800's image viewer enables you to view and organise your photographs. The image viewer manages all images taken by the built-in camera plus images loaded from elsewhere, such as received via E-Mail or synchronised in from a PC. The image viewer supports image types JPEG, BMP, GIF, MBM, PNG and WBMP.



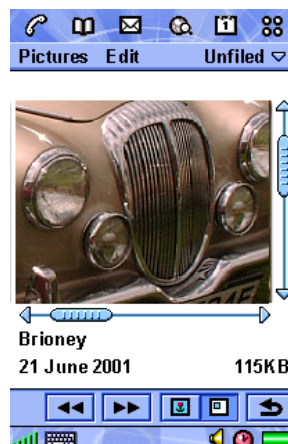
Thumbnail viewing – images may be ordered by name, date, size or type. Tap an image to see it full-screen. Alternatively, a textual list including name, size and date may be displayed.



In full screen mode, the user can browse through the images and organise them:

- Categorise into folders
- Rename or delete
- Send as E-Mail or MMS

The viewing area is 192 x 144 pixels.

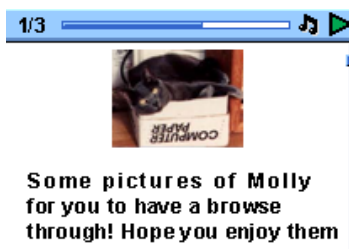


Images may be viewed 'actual size', meaning that each pixel of the source image is presented on one pixel of the screen. A full size 640 x 480 image from the camera will require 3 taps on the horizontal scroll bar to scan across it.

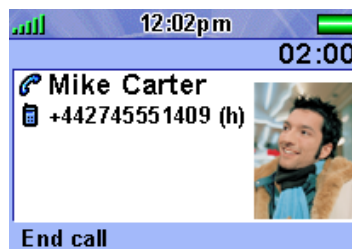
Using Images



Pictures may be loaded up to the internet. Sony Style Imaging is an on-line album enabling you to share your pictures and video clips.
www.sonystyle-imaging.com



Pictures can be easily sent as a Multimedia Message. Simply select a picture, add a message and send just like an SMS or build a slide show with several images and your favourite sound clips.



Pictures of your friends can be saved in Contacts. When a contact calls (or the user calls that contact), the picture is displayed with the details of the call. This is known as 'Picture Phone Book'

Video Playback and Streaming

The P800 Video Player plays video content that is locally stored or streamed.

MPEG-4 Standard

MPEG-4 was developed in 1998 by the Motion Pictures Expert Group, and has been incorporated into the 3GPP specifications for mobile multimedia. The earlier standards, MPEG-1 and MPEG-2 are widely in use for multimedia CD-ROMS and digital broadcast television for example. MPEG-4 has new functionality enabling to support both small mobile terminals and larger fixed devices within one standard. It has been adopted by 3GPP.

MPEG-4 has the following advantages:

- Flexible range of bit-rates supported, from 9.6kbps to 6Mbps (compared to 1.5 to 12Mbps for MPEG-2)
- High error resiliency
- Variable frame rate, enabling optimisation based on the transmission path and the overall load on the server.

Video Compression

The video compression component of the standard is called MPEG-4 Visual and covers a range of bitrates and functionalities. Profiles are used to describe functionality packages. Simple Visual Profile provides efficient and error-resilient coding of video content, and is supported by the P800 Video Player.

MPEG-4 Visual is also broken down into levels, describing such things as frame size, bitrate and buffer capacity. Level 0 is targeted at mobile devices and provides for a frame size up to 176 x 144 pixels at maximum rate of 15 frames per second.

Audio Compression

The 3GPP standard uses AMR for audio coding, though this is actually outside of the MPEG-4 standard. This is because AMR is highly optimised for the mobile environment, requiring as little as 4.75kbps bandwidth.

File Format

The file format defined by MPEG-4 has extension MP4. It is applicable for both streaming and local storage/playback. MP4 uses a structured yet flexible method to describe and encapsulate multimedia material.

3GPP PSS (Packet Switched Streaming) Standard

What is streaming?

Streaming is a method of making audio, video and other multimedia available in near real-time, over the Internet or corporate intranets. Streaming media to computers has been used during the last few years, and now, with GPRS, EDGE and UMTS, the technique is can be used with mobile phones.

The name 'streaming' refers to the technique it is based on. Previously it was necessary to download an entire file to the hard disk or mobile phone and then play it, whereas through streaming the user can begin to watch or hear the content of a requested file after only a short delay. The data in the file is broken into small packets that are sent in a continuous flow, a stream, to the end-user's computer or mobile phone. It is then possible to begin viewing the file

from the beginning as the rest of the packets are transferred to the end-user's machine or mobile phone while playing. The short delay at the start is to enable a small amount of data to be buffered. The data buffer enables playback to continue uninterrupted despite variations in the rate of received data.

Applications

The applications which can be built on top of the streaming services, can be classified into on-demand and live information delivery applications. Examples of the first category are music and video, news-on-demand applications as well as on-demand instructions material. Delivery of radio and television programs are examples of live information delivery applications.

User scenarios

- Streaming of music on demand
- Streaming of news (video, audio) on demand
- Streaming of movie trailers on demand
- Streaming and download of video on demand
- Live streaming of music/video (broadcast)

Standards, architecture and protocol

Sony Ericsson supports the architecture, protocols and codecs for the PSS (Packet Switched Streaming) within the 3GPP system, as well as supports all ongoing standardization activities within 3GPP. Sony Ericsson constantly works to follow standards and to ensure interoperability between business solutions, and also stands up to meet additional market requirements within this area. The relevant 3GPP specification is TS 26.233 "Transparent end-to-end packet switch streaming service (PSS)." The PSS includes media codecs for video, still images, bitmap graphics, text, audio, and speech.

P800 Video Player

The P800 Video Player is used in Flip Open mode.

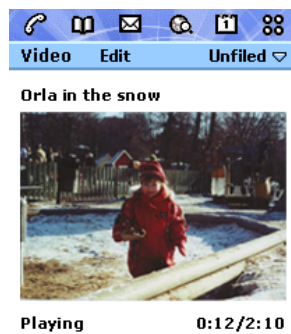
Locally Stored Clips

Video clips may be downloaded from the internet or copied over from a connected PC. Video files are large compared to still images. The demonstration videos Sony Ericsson has shown on the P800 require approximately 1 Mbyte storage per minute.

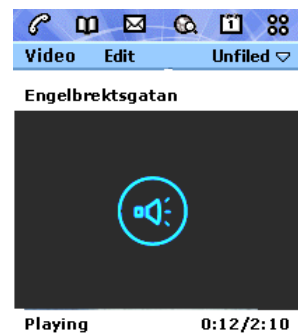
Files must be .MP4 having video coded in MPEG-4 Simple Visual Profile



Video files can be stored on the P800, organised into user-defined folders if required. Tapping a filename will start playback.



The user may pause, rewind or fast-forward the playback.



The Video Player will also play audio-only material. (AMR encoded in an MPEG-4 wrapper)

Streaming Support in the P800

The Video Player can be launched from hyperlinks in the Browser or in messages. Content is streamed using RTSP (Real Time Streaming Protocol) session control according to 3GPP specification.

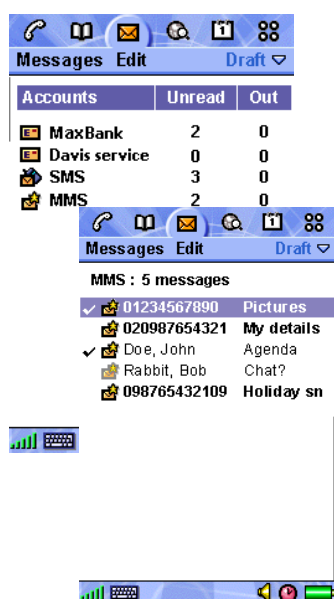
Audio support is GSM-AMR according to 3GPP

The following video codec support is provided according to 3GPP:

- MPEG-4 Simple Visual Profile Level 0
- H263 Profile 0 Level 10
- H263 Profile 3 Level 10

Messaging

The P800 has integrated messaging which supports SMS, EMS, MMS and E-Mail from a unified MMI. Messages may be addressed using the contacts data and hyperlinks are supported in all message types to create E-Mails, call telephone numbers and navigate directly to web and WAP pages that are referenced in the text.



- With the Short Message Service, a user can send text messages containing up to 160 characters to and from GSM mobile stations (up to 70 characters using Chinese text)
- With concatenated SMS, the user can write a longer message and the P800 will automatically send it using more than one SMS.
- EMS (Enhanced Messaging Service) enables the user to include graphics, sounds and different fonts as part of a text message, which can then be sent over the normal GSM/SMS service. Such messages may also be received and the extra media objects saved.
- MMS provides true multimedia capability with real pictures, sound and time-based sequencing.
- The E-Mail client supports POP3 and IMAP4 E-Mail and multiple accounts may be set up, for example business and personal.
- Attachment viewers are included for Microsoft® Word, Excel, PowerPoint® and Adobe® Acrobat® (PDF), with approx. 20 more available from the applications CD-ROM

EMS (Enhanced Messaging Service)

Enhanced Messaging Service (EMS) adds new powerful functionality to the well-known SMS standard. With it, mobile phone users can add life to SMS text messaging in the form of pictures, animations, sound and formatted text. This gives the users new ways to express feelings, moods and personality in SMS messages. As well as messaging, users will enjoy collecting and swapping pictures and ring signals and other melodies, downloading them from the Internet or editing them directly on the phone.

EMS uses existing SMS infrastructure and industry standards, keeping investments to a minimum for operators and providing a familiar user interface and compatibility with existing phones and with other manufacturers.

EMS – more than just words

Sounds and melodies

EMS gives the user the ability to send and receive sounds. These can be pre-defined sounds, such as “Chime high” and “Notify”, or melodies (ring signals in the phone), downloaded from the Internet, received in SMS messages or composed by the user on the phone keypad or a PC.

Several sounds and melodies can be inserted in one message, and they can be combined with pictures.

Pictures, animations and formatted text

Phones supporting EMS include a set of predefined pictures for inserting in SMS messages. New pictures and animations are downloaded from the Internet or received in SMS messages. Pictures can be created and edited in the phone using a built-in Picture Editor. Several pictures can be inserted in one message, and they can be combined with sounds and melodies. The users can format text in messages with different styles and sizes.



Concatenated messages

A part of the EMS standard is the support for concatenated messages, which means that the phone is able to automatically combine several messages both when creating and receiving EMS. This is useful to be able to build and display messages with rich content, since the amount of information in each SMS is limited by the SMS standards.

New possibilities with messaging

The EMS standard is now a part of the SMS standard and supported by the major network operators and mobile phone manufacturers. This universal approach enables a fast penetration and development of new services and applications within messaging.

Compatible with SMS standards

Users will find EMS as easy to use as SMS. At the moment 15 billion SMS messages, are sent every month worldwide. Roughly 80% of this traffic is user-to-user i.e. mobile phone users sending short messages to each other using the keypad of the phone to enter text. The remaining 20 % is shared by downloads and notifications of different kinds.

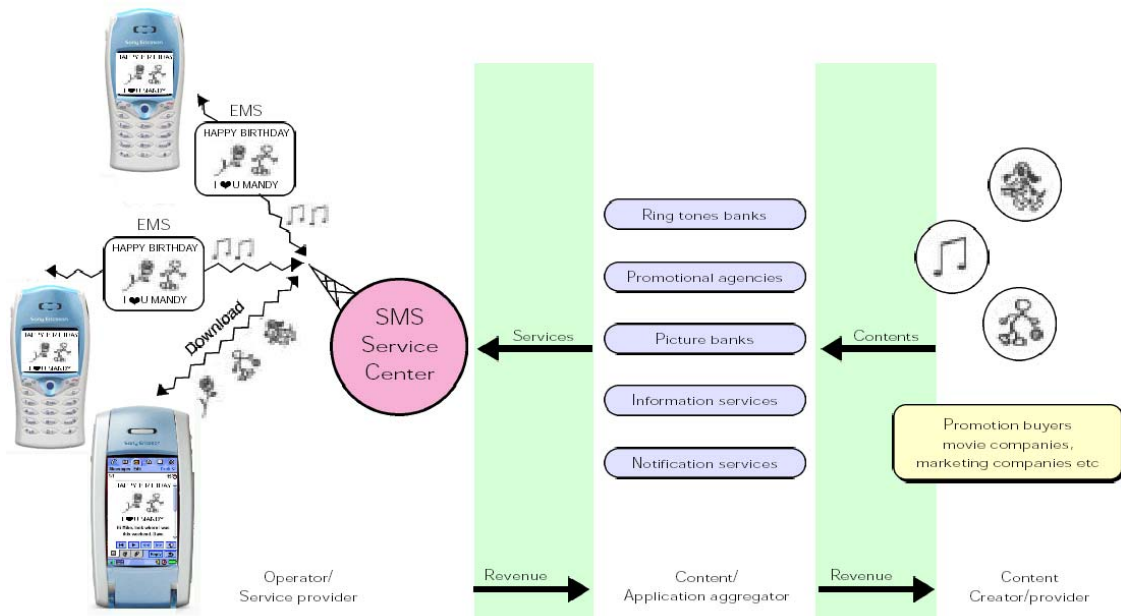
The Enhanced Messaging Service (EMS) was first submitted to the standards committees by Ericsson. Ericsson presented the outline structure of EMS to the relevant ETSI/ 3GPP committees. The major mobile phone manufacturers and most operators are actively contributing to the 3GPP standards. Hence the EMS standards have evolved and are now stable and complete as part of the 3rd Generation Partnership Project (3GPP) technical specification.

An EMS message can be sent to a mobile phone that does not support EMS, or only supports part of EMS. All the EMS elements i.e. text formatting, pictures, animations and sounds are located in the message header. The EMS contents will be ignored by a receiving phone that does not support the standard. Only the text message will be displayed to the receiver. This is true consumer-friendly standardization. EMS is compatible to SMS across most of the range of mobile phones from the oldest to the newest. Some companies in the mobile phone industry have developed their own messaging technologies, which only work with their own phone models. Network operators are in favour of EMS because it is universal – many of the major mobile phone manufacturers are constructively improving and developing the EMS standards even further for implementation in their products.

Examples of EMS contents and applications

A wide range of contents, applications and services may be developed. Below is a list of examples and areas where messaging can be enhanced with EMS:

- User-to-user message
- Message notifications for voicemail, e-mail, unified messaging.
- Ringtone signals
- Illustrated news & commercials

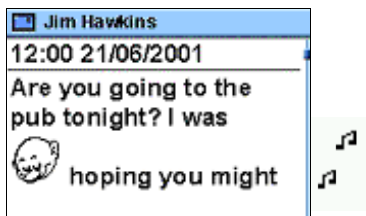


The diagram shows a model over the possibilities with Enhanced Messaging Service:

- When the Operator/Service provider enables EMS in the network, users will enjoy adding life to messages with sounds, melodies, pictures and formatted text.
- New ranges of Content/Application aggregators on the operator network or the Internet can provide EMS contents and services to the users over SMS.
- Content Creators/providers can see a new demand for creative contents. Also, promotional activities from movie companies, record labels etc can provide ring signals, movie snapshots etc.

The added value in SMS messaging will create new revenue which can be shared between the network operators, the application aggregators and the content providers.

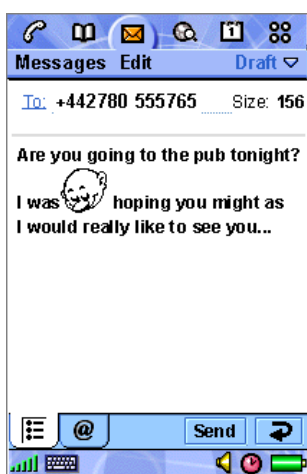
EMS in the P800



Receiving an EMS message in FC mode

In the P800, the extra facilities of EMS are integrated with the SMS MMI, making it easy for the user to enrich an ordinary text message. A selection of icons and sound objects is included and more can be added via M-Service download.

Objects in received messages may be saved for re-use when composing outgoing messages, so as well as messaging, users will enjoy collecting and swapping pictures, ring signals and other melodies.

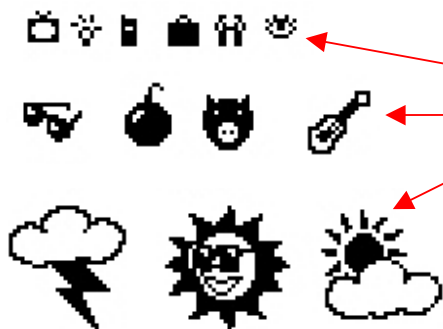


Composing an EMS message in FO mode.

There are 3 text font sizes. **Bold**, *italic*, underline and ~~strike through~~ styles are available, and text may be aligned left, centre or right.

One message may contain several EMS objects, such as a pictures, animations and sounds..

Messages may be created using the keypad to enter text in FC mode, or using handwriting recognition or virtual keyboard in FO mode.



Transmitted and received images in EMS are 1 bit black & white. The P800 supports the following pixel sizes:

- 8 x 8
- 16 x 16
- 32 x 32

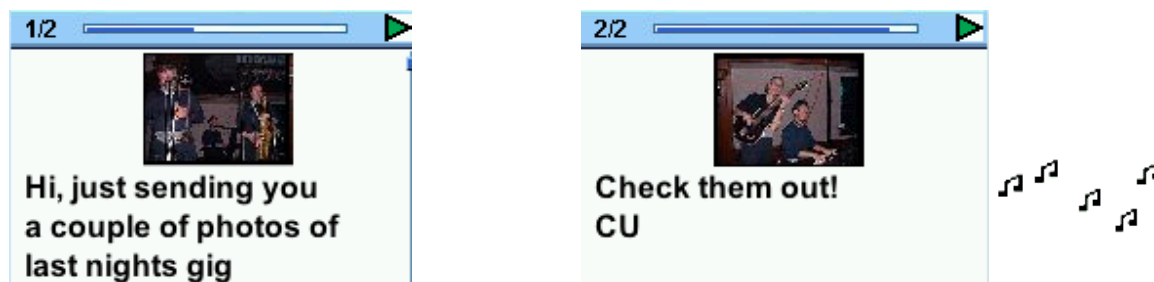
Predefined images such as 'happy' and 'ironic' are stored in the P800 and transmitted as an identifying token rather than sending the image itself. The P800 displays these predefined images in colour.

Animated images are also supported.

iMelody is the format used for sound.

MMS (Multimedia Messaging Service)

One of the key features in the P800 is the Multimedia Messaging Service (MMS), expected to become the preferred messaging method of mobile terminal users, since there are virtually no limits to the content of an MMS transmission. An MMS message from the P800 can contain text, graphics, animations, photographic images, audio clips and ring melodies.



Defined and specified by 3GPP as a standard for third generation implementation, MMS completes the potential of messaging. Sending digital postcards and multiple-slide style presentations is expected to be among the most popular user applications of MMS. Eagerly awaited by young users in particular, MMS is projected to fuel the growth of related market segments by as much as forty percent. Using the Wireless Application Protocol (WAP) as bearer technology and powered by the high speed transmission technologies GPRS, EDGE and UMTS (W-CDMA), Multimedia Messaging allows users to send and receive messages that combine text and media in slides, having a built-in timing sequence decided by the sender. The messages may include any combination of text, graphics, photographic images, speech and music clips. MMS will serve as the default mode of messaging on all terminals, making total content exchange second nature. From utility to sheer fun, it offers benefits at every level and to every kind of user.

Benefits

Essentially enabling the mobile terminal to serve as image processor and conveyor, Multimedia Messaging accommodates the exchange of important visual information as readily as it facilitates fun. Business and leisure usage of MMS will be dynamically merged, resulting in enhanced personal efficiency for users and increased network activity for operators. In short, MMS affords total usage for total communication. Because MMS uses WAP as its bearer technology and is being standardized by 3GPP, it has wide industry support and offers full interoperability, which is a major benefit to service providers and end users. Ease-of-use resulting from both the gradual steps of the messaging evolution and the continuity of user experience gained from interoperability is assured.

The MMS server, through which MMS messages are sent, supports flexible addressing (to both normal phone numbers (MSISDN) and e-mail accounts), which makes user interface more friendly and allows greater control for operators. The MMS server, moreover, is responsible for the instant delivery feature of MMS.

MMS objects

Although MMS is a direct descendant of SMS, the difference in content is dramatic. The size of an average SMS message is about 140 bytes, while the maximum size of an MMS message is limited only by the memory. Multimedia Messages will initially be in the range 30k-100kbytes. The P800 is optimised for messages up to 200kbytes. In the P800 the MMS inbox is only constrained by the amount of available user storage.

An MMS message can contain one or more of the following:

Text

As with SMS and EMS, an MMS message can consist of normal text. The length of the text is unlimited, and it is possible to format the text. The main difference between an EMS and MMS message is that in an MMS message, text can be accompanied not only by simple pixel images or melodies but by photographic images, graphics, audio clips and in the future, video sequences.

Audio

MMS provides the ability to send and receive full sound (iMelody, WAV and AMR) messages. Not only can users share a favourite song or ring signal with a friend, they can also use the mobile phone to record sound and send it along with a message. Because sound includes speech as well as music, this extra dimension of an MMS message makes for enhanced immediacy of expression and communication. Rather than sending a downloaded birthday jingle in EMS, for example, a user can send a clip of his or her own personal rendition of "Happy Birthday".

Pictures

With the built-in CommuniCam, users can take a snapshot and immediately send it using the 'Send As MMS' facility. The ability to send pictures is one of the most exciting attributes of MMS, as it allows users to share meaningful moments with friends, family and colleagues.

Mobile picture transmission also offers inestimable utility in business applications, from sending on-site pictures of a construction project to capturing and storing an interesting design concept for later review. Editing a picture by adding text allows users to create their own electronic postcards, an application that is expected to substantially cut into the traditional postcard-sending market.

The P800 supports the following image formats for MMS: GIF, JPEG, WBMP and BMP.

PIM Objects

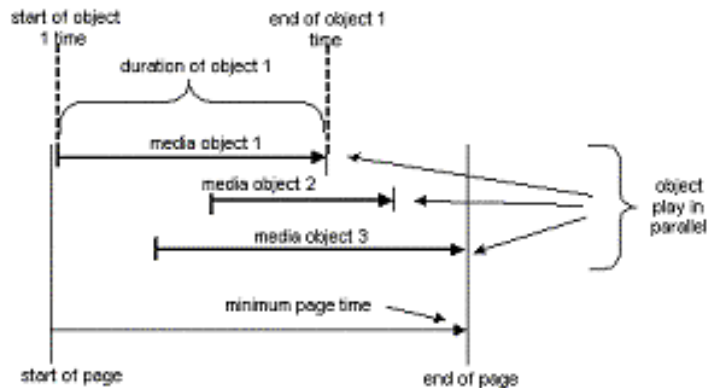
With MMS in the P800, it is easy to send and receive business cards (vCard), Calendar and Tasks entries (vCal) and Jotter notes (text content is added to a slide). Received PIM objects are listed under the 'Attachments' tab.

SMIL presentations

SMIL stands for Synchronized Multimedia Integration Language and is pronounced "smile". SMIL in the P800 allows the user to create and transmit multiple-slide style presentations on the mobile device. SMIL is an advanced XML-based protocol, and Sony Ericsson MMS supports a subset of this protocol. Using a simple media editor, users can incorporate audio and animated GIFs along with still images, animations and text to assemble full multimedia presentations. The idea of SMIL is to allow the user to customize the page timing in slide presentations. The user can decide in which order the image and text will be displayed, as well as for how long the images and text lines are to be shown in the display. The user never sees the underlying SMIL code and does not need to understand it.

The P800 has an implementation of SMIL 2.0 Basic Profile. Messages created by the P800 use a subset of SMIL as defined in the Conformance Specification (see below).

Timing of individual media objects must be inside the time-to-display for an individual slide. This provides plenty of flexibility and greatly reduces the complexity of building a presentation.



The minimum default times (to be confirmed) for each object type are shown below. Where relevant, the object may be repeated for the duration of the slide.

Object type	Start Point (Seconds from start of slide)	Minimum Duration (Seconds)
Text	0	5 seconds
Image	0	3 seconds
Animation	0	Duration of animation
Audio	0	Duration of audio clip
No Content	0	2 seconds

The user is not allowed to shorten the duration a slide such that any media item would be truncated, meaning that the minimum duration of a slide is never less than the duration of the longest object within it.

Templates

The P800 comes with a number of MMS predefined templates, for example templates for birthday cards, meeting requests etc. The user may save messages as a template, enabling personalised message formats to be created.

Notification

Incoming multimedia messages are normally notified to the user as soon as they arrive, in the same way as text messages. The user may set automatic download, so that the message is already downloaded when the notification is given. Alternatively, the user may review message notifications and decide whether to download the messages based on sender, subject, date, size, priority, class (Personal, Advertisement, Information, Automatic) and expiry date/time. It is also possible to define a filter so that selected messages are automatically downloaded. The filter criteria are message size, message class and Contacts (accept messages only from known people who are entered in Contacts).

Interoperability and Conformance

MMS is a very flexible and extendable specification. To help mobile operators launch MMS services that are consistent and reliable, Sony Ericsson and Nokia have worked together to produce a Conformance Specification ('MMS Conformance Document V2.0.0'). This provides additional guidelines that are intended to make sure that messages sent between different products are played back correctly.

The main areas covered by the specification are:

- Picture formats (JPEG/JFIF, GIF, WBMP) and size (160 x 120 pixels)
- Sound format (AMR)
- Slide layout (2 objects plus sound, layout is the same for all slides)
- SMIL subset (all timing elements are within a slide)
- Minimum supported message size of 30kbytes

The P800 has much greater capability than that stated above. The user may therefore choose whether to create and send messages that are 'Conformant', or to build and send 'Enhanced' messages that contain richer objects.

In 'conformant' mode, the user may only select media objects that are within the specification. Images will be re-scaled to 160 x 120. Total message size will be limited to 30kbyte.

In 'Enhanced' mode, the user may select a wider range of objects (for example, WAV sound clips). Images will not be re-scaled before sending.

The P800 may also be set to build messages in 'Enhanced' mode, yet warn the user if the message goes outside the conformance criteria.

When non-conformant messages are received, they will be displayed within the capability of the SMIL player. If the message is edited, objects may be saved, replaced or deleted (but no new objects added) and conformant slides may be added.

Media Object Summary

The table below shows the media standards supported by MMS on the P800.

Standard	Media Type	Conformance	Render
US-ASCII	Text	Y	Y
UTF-8 encoding	Text	Y	Y
UTF-16	Text	Y	Y
UCS-2 ISO/IEC 10646	Text		Y
AMR	Speech	Y	Y
MP3	Audio		Y
WAV	Audio		Y
iMelody	Audio		Y
JPEG	Image	Y	Y
GIF-87a	Image	Y	Y
GIF-89a (spec includes animated)	Image	GIF89	Y
WBMP	Image	Y	Y
BMP	Image		Y
PNG	Image		Y

The MMS player will render all of the above formats. The display window for images is 200 x 120 pixels in FC mode and 200 x 200 pixels in FO mode. These are the optimal sizes for images where MMS messages are composed specifically for the P800. Incoming images larger than this will be re-scaled to fit within the window, preserving aspect ratio.

When composing an MMS, the user may select any of the media formats when in 'non-conformant' mode. In 'conformant' mode, only the indicated formats will be accepted for inclusion in a message.

Composing a multimedia message

Multimedia messages may be created in FC or, as shown below, in FO mode.



Composing an multimedia message is like building a small slide presentation. A typical slide will consist of a picture, some text and a sound. Text and sound can be added to complete a slide.

The user can set the duration of the slide. If a sound is added, the slide duration is set to the duration of the sound clip.

Slides can be chained together to make a sequence. Timing elements can be added to control the display of images and text within a slide. The user can preview the message before sending and make any timing adjustments via the MMI. Slide order may also be changed.

Multimedia messages can be created using any suitable media in the user storage space – including media downloaded from the internet, synchronised from a PC or created on the P800 itself. Simply tap the placeholder in the slide template and select the required item.



An image editor is provided so that images may be modified before sending. The available functions are:

- Crop (Select a part of the picture, for example just the cat)
- Rotate
- Pen (Draw on the picture in a choice of colour and thickness)
- Eraser (Erase writing/image)
- Scale (Resize image)

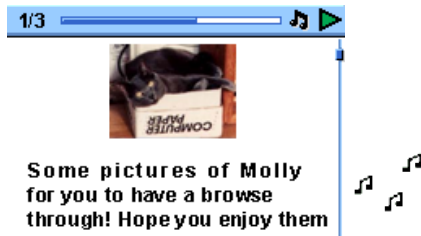
The pen function enables notes and drawings to be made on images. These become part of the image and cannot be erased separately from the image itself. The annotated image (with pen) is saved separately and sent with the message, leaving the original image unmarked.

The MMS message is compiled using MIME standards and consists of the following parts:

- One part containing the description of the slides, using MMS SMIL.
- One part containing the actual contents of the slides – text, images and sound.

Receiving a multimedia message

Incoming MMS messages typically arrive just like SMS messages – automatic delivery with notification to the user. Messages are located in the MMS Inbox.



FC playback of a multimedia message



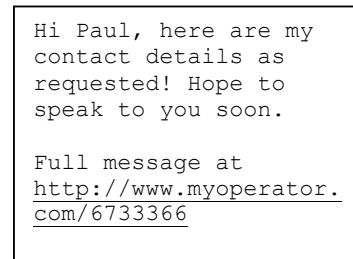
FO playback

Receiving a multimedia message on other terminals

Interoperability is dependent upon the capability of the receiving terminal and the MMS server in the mobile network. Here are some examples.



The Sony Ericsson T68i is enhanced with MMS, enabling multimedia messages to be exchanged with excellent compatibility.

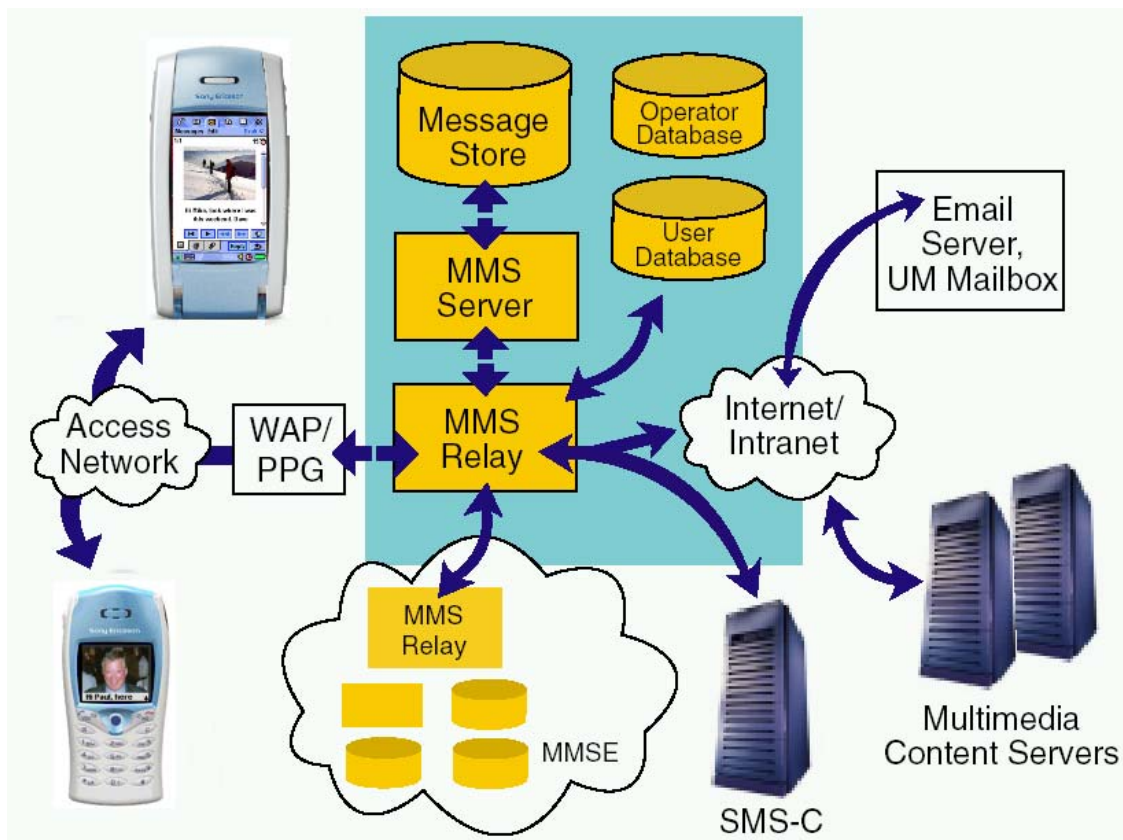


A mobile without MMS may be sent the text by SMS together with a URL which enables the picture and message to be seen via the WAP browser.

MMS technical features

The MMS standard, just like SMS, offers store and forward transmission (instant delivery) of messages, rather than a mailbox-type model. MMS is a person-to-person communications solution, meaning that the user gets the message directly into the mobile. He or she doesn't have to call the server to get the message downloaded to the mobile. Unlike SMS, the MMS standard uses WAP as its bearer protocol. MMS will take advantage of the high speed data transport technologies EDGE and GPRS and support a variety of image, video and audio formats to facilitate a complete communication experience.

For more information and to see a demonstration of MMS, go to <http://www.ericsson.com/mms/demo>



Message conversion

The MMS-C is able to perform limited message conversion - for example, from MMS to SMS - so that processing and air time is not wasted in sending messages to mobile terminals that do not have adequate capability to receive them. It also handles service aspects such as store and forward, guaranteed delivery, subscriber preferences, operator constraints, and billing information. The MMS-C also vouches for high quality messaging, e.g. by format conversion. This means that the MMS-C recognizes which formats are supported in the mobile phone, and adapts the MMS messages to these formats. The WAP User Agent Profile (UAProf) is used to communicate the handset's capabilities to the MMS server.

Architecture

The MMS Centre (MMS-C) is comprised of the MMS Server, the MMS Proxy-Relay and the MMS Store. The MMS Centre is the central element of the MMS network architecture, providing storage and operational support, enabling instant delivery of multimedia messages from terminal-to-terminal and terminal-to-e-mail, and supporting flexible addressing. The centre's MMS Proxy-Relay interacts with the application being run on the MMS-enabled terminal to provide various messaging services. WAP is used as bearer of an MMS message between the MMS-C and the MMS client (application). The WAP Gateway is used for delivery and retrieval of messages

OTA configuration

Users can easily get MMS into their phone. MMS is configurable via OTA, meaning that the user does not have to configure the settings manually. The configuration is done by the operator.

E-Mail

The P800 E-Mail client supports POP3 and IMAP4 mail servers, MIME attachments and SMTP for sending mail. These are the standards supported by most Internet Service Providers and many corporate environments. Any number of E-Mail accounts may be set up – a typical configuration will be one business and one personal account. OTA configuration of E-Mail and ISP accounts is supported. E-Mail accounts and associated ISP accounts may be remotely configured over the air.

Built-in password generators from RSA Security, Secure Computing and Vasco make it possible for the P800 to connect corporate networks which use these popular access controls, so allowing corporate e-mail to be used.

When connected via GPRS, automatic polling can be used so that E-Mail is automatically collected and presented in the Inbox. Controls are provided to filter messages based on size, enabling cost and download time to be managed. Another option enables only e-mail headers to be presented in the inbox. Headers are quick to download. The user may read and select headers and request the message to be downloaded.

Attachments may be viewed using the built-in viewers for Microsoft® Word, Excel, PowerPoint® and Adobe® Acrobat® (PDF). More viewers (for over 20 formats) may be loaded from the supplied CD-ROM.

A signature may be set up so that essential details are automatically copied to the end of each outgoing E-Mail.

The supplied PC synchronisation software enables E-Mail to be synchronised with Microsoft® Outlook® and Lotus® Notes®.

Web and WAP based E-Mail can, of course, be accessed using the P800's browser.

Browser, M-Services and MeT

The P800 features an integrated browser capable of browsing WAP and Web (HTML) content from a common Man Machine Interface (MMI).

M-Services

M-Services is a set of feature guidelines published by the GSM Association with the support of leading mobile network operators and handset manufacturers. These include easy start-up for the user, better user experiences, easy download of contents, and simple charging models. Technically, the guidelines cover existing standards including WAP, MMS, EMS, SIM-AT and SyncML. Requirements are also made in the areas of MMI, MIME descriptors, media formats and codecs.

For developers and operators, this means that a standardised yet rich set of services can be deployed simply. Users will be able to enjoy a new world of consistently available and advanced mobile internet services such as:

- Pictures
- Wallpapers
- Screensavers
- Audio / Ring signals
- Games

The P800's large colour touch-screen, dedicated browser access button and large amount of memory exceed the requirements of M-Services. The MMI meets many of the recommendations. Since the P800 has a proper filing system for storage of media, download content is typically stored to file such that it is available to many applications including the P800's customisation settings. The P800 supports both WAP Provisioning and the established Ericsson/Nokia OTA provisioning standards – see Customisation section for more details.

MeT – Mobile electronic Transactions

With the introduction of WAP it has become possible to access mobile Internet services and undertake mobile e-commerce transactions. One of the key elements is the ability for any phone to operate with any service in this mobile e-commerce environment. This is why Sony Ericsson, Motorola, Nokia, Panasonic, NEC, Siemens and others have teamed together to create a common industry framework for mobile commerce - the Mobile electronic Transactions (MeT) initiative. Members come from handset manufacturers, financial institutes, mobile operators, security specialists and technology /solutions vendors. The MeT initiative co-operates with MasterCard International's Global Mobile Commerce Forum.

MeT has the aim of establishing a framework for secure mobile transactions, ensuring a consistent user experience independent of device, service and network. It is a global initiative to ensure that interoperable mobile transaction solutions are developed around the world - enabling consumers to access goods and services seamlessly wherever they may be.

MeT builds upon existing industry standards such as WAP, WTLS, WIM and PKI.

MeT covers the following core functions:

Initiation	Providing the Personal Trusted Device (PTD) with key pairs for authentication and signing.
Registration	Providing the PTD with certificates associated with its keys.
Secure Connection	Establish an encrypted link with the server in order to keep information private.
User Authentication	Prove the identity of an individual or an application.
Digital Signatures	Authorise a contract by means of a user signing text (see example below)

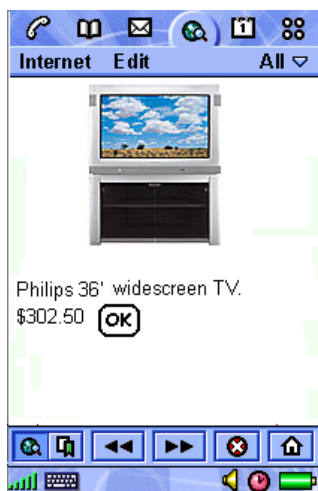
The P800 fulfils the compliance requirements for MeT version 1.0, (February 2001), according to the following MeT specifications:

- Met Core Specification
- MeT PTD Security Requirements
- MeT CUE Consistent User Experience

More information on MeT may be found at <http://www.mobiletransaction.org/>

MeT Example

Whilst shopping around for a new television set, the user finds a good price from a store and decides to order immediately. The store requests a 'signed text' confirmation from the customer:



As with many online transactions, the user enters all the details and must then press OK to confirm the transaction.



The user is requested to sign the transaction using a suitable certificate.



The certificate has a related signature PIN. The user enters the PIN to confirm the transaction.

P800 Browser

Content Types Supported

The P800's supports all of the following content types within a single browser, directly or via a gateway/proxy.

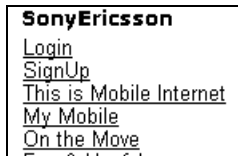
World Wide Web (WWW) - HTML



The WWW is the most popular method of publishing information on the internet and on company intranets. Content is organised using the Hypertext Markup Language (HTML).

The P800 browser can read HTML pages and therefore gives access to a vast amount of existing material. Of course, much of the content on the WWW is aimed at large screens and will therefore require scrolling on the P800. However some websites, and more frequently those of interest to the mobile user, have 'low graphics' or 'mobile friendly' options which are better suited to small screens.

Wireless Application Protocol (WAP) - WML



WAP uses Wireless Markup Language (WML), which is like HTML but specially optimised for mobile devices. The P800 browser is compliant with WML1.2.1 and therefore gives access to a world of existing WAP content. The large touch screen and multiple WAP accounts make it easy to access and surf WAP pages

Wireless Application Protocol (WAP) 2.0 – xHTML



Extensible Hypertext Markup Language, xHTML, is a combination of HTML 4.0 and XML, managed by the World Wide Web Consortium. xHTML Basic provides a common subset of features to enable the design of pages that will work on small handheld devices, yet rich enough for content authoring.

In WAP 2.0, xHTML Basic is extended with additional markups to create xHTML Mobile Profile. This is the core markup language for WAP 2.0.

WAP 2.0 introduces many new facilities including colour graphics, animation, large file downloading and improved menu handling.

cHTML



Compact HTML is a version of HTML optimised for small handheld devices. It is widely used in Japan. The P800 browser will display cHTML content where it is available on the internet or from mobile operators over GSM/GPRS.

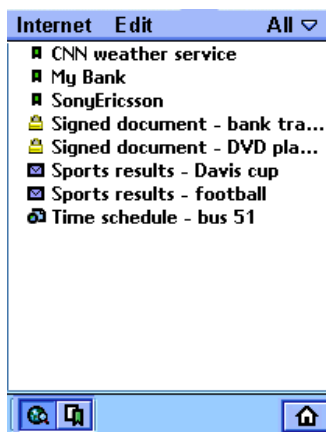
Browser MMI



The browser is always close at hand, having a dedicated hardware button. It may also be reached from the application picker and the application launcher.

The touch screen makes navigation very quick and simple – just tap a bookmark or a link to navigate. The Jog Dial can also be used to locate and select a link.

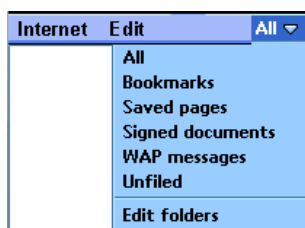
The browser is used in FO mode.



Bookmarks and other information is presented in a simple list view. Just tap a bookmark to view the page. As in the R380, WAP Accounts may be stored in a bookmark, ensuring that the correct WAP/internet service provider is used to access the required page.

Pages may be saved to local storage. They are kept in the bookmarks list and may be opened offline.

WAP Push messages are received within the browser and presented in the list view.



The user may organise bookmarks into user-defined folders, for example creating a folder of sports bookmarks and a folder of transport bookmarks.

It is also possible to view a list of all signed documents (see MeT example above) and access incoming WAP Push messages.

Browser Security

World Wide Web

The P800 supports the TLS/SSL to provide a secure encrypted link between the browser and the website. This method is commonly used for secure transactions on the WWW.

WAP Security

When using certain WAP services the user may want a secure connection between the phone and the WAP gateway, for example when using banking services. An icon in the display indicates when a secure connection is used. The P800 is based on the WAP 2.0 specifications where security functionality is specified with a technology called Wireless Transport Layer Security (WTLS).

The WAP protocols that handle the connection, its transport and its security are structured in protocol layers. The security is handled by the WTLS layer operating above the transport protocol layer. There are 3 WTLS classes that define the levels of security for a WTLS connection:

- WTLS class 1 involves encryption with no authentication.
- WTLS class 2 involves encryption with server authentication.
- WTLS class 3 involves encryption with both server and client authentication

Server authentication Requires a server certificate stored at the server side and a root certificate stored at the client side.

Client authentication Requires a client certificate stored at the client side and a trusted certificate stored at the server side.

A Wireless Identity Module (WIM) can contain both trusted and client certificates, private keys and algorithms needed for WTLS handshaking, encryption/decryption and signature generation. The WIM module can be placed on a SIM card and will then be referred to as a SWIM card.

Certificates

To use secure connections, the user needs to have certificates saved in the phone. There are two types of certificates:

Certificate authority A certificate used to verify that a WAP site is genuine. If the phone has a stored certificate of a certain type, it means the user can trust all WAP gateways which present a certificate that can be verified by the trusted certificate. Certificates can be preinstalled in the phone, pre-installed in the SWIM, or downloaded from the trusted supplier's WAP page.

User certificate A personal certificate that verifies the user's identity. A bank that the user has a contract with may issue this kind of certificate. User certificates can be pre-installed in the SWIM card.

WIM Locks (PIN Codes)

There are two types of WAP security locks (PIN codes) for the WIM on SIM. The locks protect the subscription from unauthorized use when browsing. The locks should typically be supplied from the supplier of the SWIM.

Access lock	An access lock protects the data in the WIM. The user is asked to enter the PIN code the first time the SWIM card is accessed when establishing a connection.
Signature lock	A signature lock is used for confirming transactions - like a digital signature.

Push Services

These are useful for sending updated WAP site contents or WAP links to mobile users. Examples of services that can be implemented using push services:

- Notifications about new E-Mails, voice mails, etc. Instant messaging and chat
- News, sport results, weather forecasts, financial information (stock quotes etc.)
- Personal Information Manager (PIM) - delivery of contacts, meeting requests etc.
- Interactive games, e.g. play poker with a friend

There are two different forms of Push services, Service Indication and Service Loading. Reception of push messages and automatic load of URL (see below) may be turned on and off in the P800 user preference settings.

Service Indication (SI)

A Service Indication message contains a short text message and a URL. In the P800, these types of messages are typically stored in the WAP messages inbox which is integrated with the bookmark list in the browser application. When the user opens a message, both the text message and the URL will be displayed. The user has the options to postpone the message, load the URL or to delete the message.

Service Loading (SL)

A Service Loading message contains a URL. When such a message is sent to the P800, the URL will automatically be loaded into the browser application.

Symbian OS Operating System

Symbian is the company that developed the Symbian OS technology. Symbian OS is the operating system for Wireless Information Devices, and can be found in a wide range of PDA, communicator and smartphone designs. The Symbian OS technology delivers application and communication capabilities in a small package - it has a robust system kernel, powerful object-oriented middleware, industry-standard communication protocol suites, and an optimised implementation of Sun's Java™ language. Symbian OS is the largest-selling operating system for smartphones and communicators.

The P800 Smartphone is based on Symbian OS v7.0 and the established UIQ MMI. Sony Ericsson and Symbian have been actively working with software developers for some time, and a range of UIQ-based applications have already been publicly demonstrated. Sony Ericsson is also an active participant in developer events such as the Symbian Developer Conference and Java One.

Third party applications may make use of the communications, display and storage facilities of the P800. Such applications may therefore be much more powerful than browser-based applications, enabling games to be faster and more exciting, for example. Applications from other PDA OSs and from the PC world may be expected to be ported across to the P800. Applications already available for Symbian OS (for example, on Psion products) may be ported by the supplier to run on the P800.

The P800 supports Java-based applications. Java technology is platform-independent, portable, modular and secure. Java applications are easy to develop, deploy and maintain. Because it supports both PersonalJava™ and J2ME CLDC/MIDP (see next page), the P800 is ready to run many applications written for handheld computers and mobile phones.

The P800 has 12 Mbyte user data space in which settings, user data and third party applications are stored. (9Mbyte on the P802). Applications are easily downloaded directly to the P800 using the browser, or may be installed from a connected PC.

Key consumer applications for the consumer include games, instant messaging, chat, information and entertainment. Corporate applications may be deployed on the P800, extending information access to the smartphone.

More information regarding projected availability of third party applications will be provided closer to launch time.

Open Environment

Applications may be written in both C++ and Java. Supported Java environments are PersonalJava™ and J2ME CLDC/MIDP, both of which are optimised for quick start-up time.

C++

C++ is the most comprehensive and flexible programming environment, which enables rich applications to developed. C++ applications will run faster than those written in Java.

Java

Java is a widely used and extensible programming platform which makes the development of personalized applications and content much easier. Originally developed by Sun in 1991, Java is a programming language used to develop applications – utility programs, games, plug-ins etc. – for different hardware and software platforms. Users of Java-enabled devices can install new applications and games to make their devices more personal and adapt them to specific needs.

Sun marketed Java as a “write once, run anywhere” concept, which at the time was a good description of Java’s strength. Simply put, Sun based the Java concept on two parts, the Java application and the Java interpreter, known as the Java Virtual Machine (JVM). A Java application cannot run by itself, it needs an interpreter that translates the code and runs the program. This was really the secret behind Java’s ability to work on various platforms. A developer could write an application without having to think about different computers and operating systems as long as hardware and software manufacturers included Java Virtual Machines in their products.

Even if “write once, run anywhere” still applies to some degree, the evolution of handheld computers and telecommunications forced Sun to adapt Java to the requirements of mobile devices with small displays and slow connections. This has led, among other things, to the development of PersonalJava and subsequently to Java 2 Micro Edition, (J2ME).

PersonalJava™

PersonalJava, also known as pJava, is an edition of Java appropriate for mobile devices such as PDAs. It is suited to more powerful smartphones and PDAs, such as the P800, and has a richer development environment and can interact more extensively with the P800 functionality compared to J2ME MIDP/CLDC.

PersonalJava was transferred into the J2ME platform in 1999, becoming the J2ME CDC/Personal Profile. However, CDC/Personal Profile has not really taken off yet and, pending its breakthrough, PersonalJava will still be a powerful option for years to come.

The P800 includes Symbian’s implementation of PersonalJava according to the Sun Microsystems ‘PersonalJava Application Environment Specification (PJAE)’ version 1.1.1, January 7, 1999. That version corresponds to a Sun JDK 1.1.7 implementation.

PersonalJava applications can make use of the following services:

- TCP/IP network communication
- Graphical User interface library – AWT widgets are mapped on to Symbian OS controls where applicable)
- JavaBeans support
- Virtual Keyboard and Jog Dial (up, down, select) input
- File System access
- Time/Date sensing
- JNI – Java Native Interface

PersonalJava applications are typically transferred to the P800 from a connected PC.

PersonalJava applications are used in FO mode. If the flip is closed, the application will receive an event and may choose to close or continue running in the background. There is no MMI available in FC mode.

J2ME CLDC/MIDP

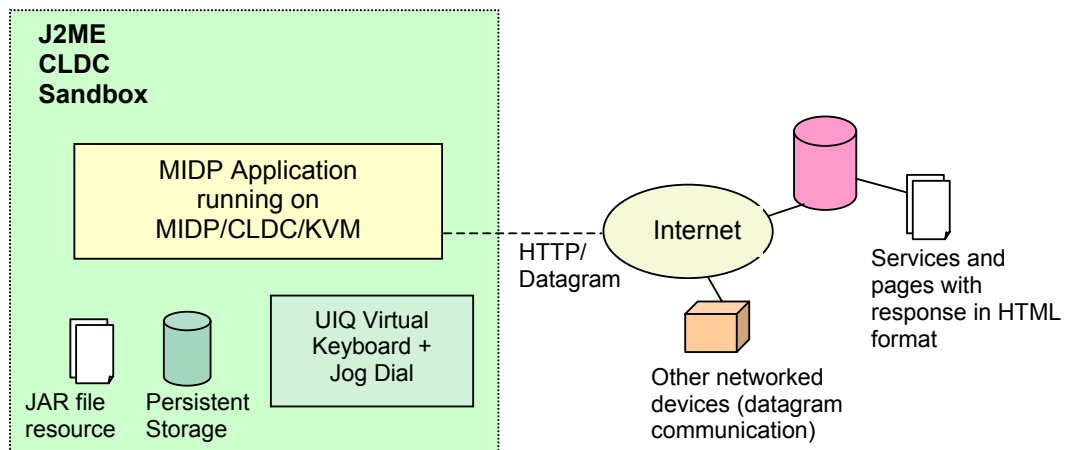
J2ME CLDC 1.0 (Java2 Micro Edition, Connected Limited Device Configuration, version 1.0) is an edition of Java aimed at small resource-constrained mobile devices where the runtime environment must fit into a few hundred kilobytes of memory (as compared to the 2.5Mb required for a typical PersonalJava environment).

MIDP (Mobile Information Device Profile) defines a programming API which has gained wide industry acceptance, and many MIDP compliant mobile phones are anticipated to come to market. A large number of applications for this environment is therefore to be expected.

The P800 supports this J2ME CLDC 1.0 / MIDP 1.0 environment. Applications may make use of the following services:

- Persistent storage (RecordStore class only – no access to the rest of the filing system)
- Display – full 276 x 208 (i.e. minus the application picker and status bar)
- Touch Screen
- Virtual Keyboard and Jog Dial (up, down, select) input

J2ME/CLDC uses a security model, often referred to as a sandbox. The sandbox includes a number of system components working together to ensure that untrusted applications cannot gain access to system resources.



MIDP applications can interact with arbitrary remote services that exist as a URL. Data may also be exchanged with remote devices that accept an HTTP or datagram connection.

Applications are typically downloaded from the mobile operator's portal or the internet.

Applications are used in FO mode. When the flip closes, the instance of the Virtual Machine is not visible, but the user may return to the application by selecting it from the Application Launcher.

Developer Support



A range of developer support options are available:

Sony Ericsson Advanced Developer Support

Our most comprehensive annual support service package, the Advanced Developer Support equips professional developers with everything they need to successfully develop world-class applications for Sony Ericsson products. With this support contract, developers get access to a high-quality online support with fast response and resolution times and up to 50 technical support incidents. They also get access to early technical product information and development tools as well as the complete range of interactive and static online support resources. This service requires a paid subscription.

Sony Ericsson Basic Developer Support

The Basic Developer Support is an annual support service package that provides developers with all the basics to successfully develop world-class applications for Sony Ericsson products. With this support contract, developers get access to a high-quality online support with same-day response and resolution times, five technical support incidents as well as the ability to purchase more. They also get access to complete technical product information and development tools as well as the whole range of interactive and static online support resources. This service requires a paid subscription.

Sony Ericsson Online Support

Some online resources are available to all developers for free, all that is needed is to register as an Ericsson Mobility World Community member. After registration, access is granted to selected technical product information and development tools as well as limited access to interactive and static online support resources.

Security

Sony Ericsson will provide service through Ericsson Mobility World which will enable application developers to obtain a certification of their applications from Sony Ericsson. More details will be provided nearer launch time.

Digital certificates are used to classify the status of applications and media that are to be loaded:

Unsigned	No certification or testing : <ul style="list-style-type: none">• The provider of the application has not been assessed• There is no guarantee that the application is from the advertised source• The application may or may not have been tested to ensure that it works well on the P800, but any claims to that effect are not independently tested.
Signed & Certified	Both the software vendor and the application have been tested and certified. <ul style="list-style-type: none">• The application is certified as originating from the named vendor• The application has been tested to check compatibility with the P800

End users should select certified applications wherever possible, in order to avoid the risk of a badly written or malicious application creating problems such as deleting data, corrupting the configuration or preventing other applications from operating correctly.

Mobile Operators may choose to factory-customise the P800 such that only certified applications can be loaded.

Customisation

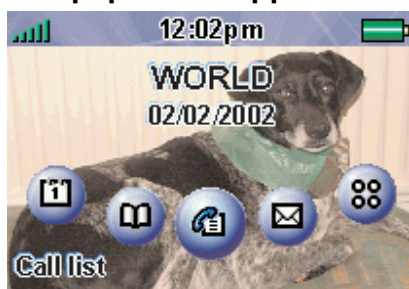
The P800 may be customised in a number of ways:

- In the factory or at a Sony Ericsson Service Point, on behalf of a mobile operator.
- Via Over The Air (OTA) configuration, initiated by operator, user or IT helpdesk.
- By the User (via the MMI, including interactive M-Services)

A system reset will remove all user customisation and set the P800 back to the factory-customisation state of the device.

User Customisation

Wallpaper and Application Shortcuts



The user may set a static image to be the background 'wallpaper' for the FC standby screen. Image size is 208 x 320 pixels and formats JPEG, GIF, BMP, WBMP, MBM and PNG are supported. The upper part, 208 x 144 pixels, carries the image seen in FC; the lower part may be set to a colour or design to influence the light which shines through the keys.

Background images may be downloaded via M-Services. Suitable images may also be beamed in to the P800 using Bluetooth or Infrared, or transferred in over the PC link.

The application shortcut buttons may be customised by the user.

Screen Saver



A 'screen saver' image is displayed after a period of inactivity. The user can switch this facility on and off and select the delay period before the screen saver is displayed. Image format is the same as the Wallpaper image above. The top part of the image is displayed in FC mode and the entire image is displayed in FO mode.

Key lock and device lock may be used in combination with the screen saver. Upon pressing a button or touching the screen, the user will be prompted to activate keys and/or enter the device lock code.

When the screen saver or screen blanker is deactivated, the P800 will revert to the state it was in before the screen saver was activated.

Picture Phone Book



The user may store a picture of each person in Contacts. When an incoming call is received with CLI matching that contact, the contact's picture will be displayed together with the other information. The contact's picture is also displayed when making a call.

Pictures are easily taken using the built-in camera, though of course other images can be loaded in to Contacts.

Ringtones



The P800 can play both iMelody format ringtones and real sound files (WAV, AU, AMR). The user can add as many ringtones as desired, subject only to available file space.

A ringtone may be selected for a person in Contacts, so that the caller can be identified by the ringtone that is played.

Ringtones may be collected from many sources including M-Services, MMS, EMS and transfer from a PC.

The recommended format for WAV files is PCM, 22,050Hz, 8 bit, Mono, often called 'radio quality'. This format requires approximately 22 kilobytes of space for each second duration. Many PC audio applications support WAV.

Other Audio Customisation

The following sounds are also customisable in the P800:

- World Clock (alarm)
- Calendar (reminder alerts)
- Tasks (reminder alerts)
- Messaging (notification of new message)

Over-The-Air (OTA) Customisation

OTA remote configuration provides simple set-up of services. The user is spared the task of finding complex technical information and then manually entering it via the MMI. Instead, a web request or a call to be the mobile operator's helpdesk is all that is necessary – the appropriate settings can then be sent via SMS directly to the P800.

OTA configuration using the Ericsson/Nokia Over The Air Settings Specification enables the following parameters to be provisioned:

- WAP Account (Account name and WAP Gateway information; Like a WAP Profile on the R380)
- ISP Settings (Bearer information, username, password)
- Bookmark (name and URL)
- SyncML settings
- MMS Settings

The following parameters may be remotely configured according to WAP Forum specifications:

- WAP Account
- ISP Settings
- Bookmarks

Further OTA configuration is provided using Nokia Smart Messaging. It is used to set up E-Mail accounts, specifically:

- ISP (Bearer information, username, password, IP and DNS addresses, login script)
- E-Mail account (Username, password, address, server details)

Sony Ericsson WAP Configurator

Sony Ericsson's WAP Configurator provides WAP settings for many networks as a free service to owners of Sony Ericsson mobile phones. It may be found at <http://www.sonyericsson.com/>.

Factory Customisation

Factory customisation will be available to mobile operators and volume customers. This enables the hardware, applications, settings and media to be tailored to customer needs, including:

- Customised One-button Internet Access
- Pre-configured settings. ISP, WEB / WAP, GPRS etc
- Pre-loaded content, including screensavers, wallpapers, ring tones, local WAP/WEB pages, pictures, demonstration MMS messages.
- Bookmarks
- Pre-loaded applications. Games, extended security, 3rd party applications
- Organiser entries. Calendar, contacts, Jotter notes, Voice notes etc.
- Certificates
- Customised Flip
- SIM lock

Customisation is carried out by loading the P800 with a uniquely identifiable customisation package, made up from the following elements:

- Default values for user configurable settings
- Default values for hidden settings (i.e. settings unavailable to the user via the UI. Hidden settings are used to switch between customisation alternatives anticipated in the generic system software).
- Preloaded user data (i.e. content such as welcome documents and messages, notes, contacts, etc.)
- Preinstalled executables (i.e. executable wizards, 3rd party applications, etc.)

Bluetooth™ Wireless Technology

The P800 features built-in Bluetooth wireless technology. Its short-range radio link operates in the globally available 2.4 GHz frequency band, ensuring fast and secure communications up to a range of 10 metres.

Bluetooth wireless technology is designed to be fully functional, providing high transmission speeds, even in noisy radio frequency environments. All data transfer is protected by advanced error-correction methods, ensuring a high level of data security.

Bluetooth wireless technology facilitates instant connections, which are maintained even when the devices are not within line of sight. High-quality voice transmission is provided under adverse conditions, making it possible to use a headset connection to the P800 at all times.

Sony Ericsson is a founding partner of the Bluetooth Special Interest Group (SIG). Bluetooth wireless technology devices that are expected to be available in the near future, include:

- Headsets for wireless voice transmission and remote call control
- PCs, laptops, PDAs, palmpads for data transfer, synchronization etc.
- PC cards for Bluetooth wireless technology in laptops and PDAs
- MP3 music player
- Other phones for exchanging business cards, ring signals, playing games etc.
- Digital still and motion video cameras
- Printers, hard disks and other storage devices
- Handheld scanners for text, barcodes and images

Please note that in countries where the use of Bluetooth wireless technology is not allowed, the Bluetooth function should be switched off. Contact a Sony Ericsson representative to check if the use of Bluetooth wireless technology is restricted in your country.

Benefits of Bluetooth wireless technology in the P800

No cables	Bluetooth wireless technology gives a true wireless connection to headset, computers, networks, printers and other devices.
Radio Link	Bluetooth does not require line-of-sight alignment. For example, when using the P800 to connect a laptop to the internet, a Bluetooth link between the laptop and the P800 means that the P800 can be in a jacket pocket, or placed near a window for better reception.
Several devices	The P800 can maintain several devices in a pairing list, enabling rapid connection when those devices are in range.
High transmission speed	Faster than infrared or RS232 cable
Secure and fast	Data connection with a Bluetooth PC/laptop turns the phone into a modem for connecting to the Internet and for data transfer (no need to find and plug in cables or to align infrared sensors).
Synchronisation	Fast synchronization, even without line of sight, of calendar and phone book with PC/laptop and PDA Quick exchange of business cards, calendar events and melodies with other phones and devices.
Low power	Low power consumption.

Bluetooth Usage Cases with the P800



Bluetooth Headset

- Make and receive calls using the buttons on the handset and voice command.
- Multiple headsets can be defined, for example a Bluetooth personal headset and a Bluetooth car kit.



Laptop PC / PDA

- Connect to P800 over Bluetooth and use it as a modem to connect to the internet.
- Synchronise data.



Mobile Devices

- Share business cards and appointments using vCard and Vcal
- Share photographs and sound clips

Synchronization & Data Transfer

In everyday life, access to an updated calendar and details of friends and business colleagues is greatly appreciated. To be truly mobile, users must be able to carry their important information with them. Equipping mobile phones with Personal Information Manager (PIM) programs like calendars, task lists and address books gives users access to their most important data anywhere and anytime. The information is kept updated by synchronizing with the information at the office or at home. The growing use of groupware such as Microsoft® Outlook® and Lotus® Notes® means that more and more meetings are booked electronically in daily business life.

The P800 uses the SyncML protocol for synchronisation. This means that it has compatibility to synchronise with a wide variety of devices over a number of different communications media.

SyncML – An Open Standard for Synchronisation

SyncML Background

Leading the way in providing remote synchronization capability, Sony Ericsson realizes that interoperability of remote synchronization is of utmost importance if mobile data usage is to become as widespread as generally predicted. That is why Ericsson, along with IBM, Lotus, Motorola, Matsushita, Nokia, Palm Inc., Psion and Starfish Software, founded the SyncML initiative in February 2000. Supported by more than 600 software and hardware developers, the SyncML initiative seeks to develop and promote a globally open standard for remote synchronization, called SyncML. Unlike many other synchronization platforms, SyncML is an open industry specification that offers universal interoperability. Because it uses a common language, called XML, for specifying the messages that synchronize devices and applications, SyncML has been called the only truly future-proof platform for enabling reliable and immediate update of data. The benefit for the end user is that SyncML can be used almost anywhere and in a wide variety of devices, regardless of application or operating system

What is SyncML?

SyncML is the common language for synchronizing all devices and applications over any network. SyncML leverages Extensible Markup Language (XML), making SyncML a truly future-proof platform. With SyncML any personal information, such as E-Mail, calendars, task lists, contact information and other relevant data, will be consistent, accessible and up to date, no matter where the information is stored. For example, a calendar entry made to a mobile device on a business trip is equally available to a secretary in a network calendar. SyncML is the ultimate choice for remote synchronization.

The P800 uses SyncML for both local synchronization (for example, with a PC using Bluetooth or a cable connection) and remote synchronisation over HTTP.

Designed for the requirements of the wireless world

SyncML is designed specifically with the wireless world's tight requirements in mind. SyncML minimizes the use of bandwidth and can deal with the special challenges of wireless synchronization, such as relatively low connection reliability and high network latency. SyncML supports synchronization over WAP, fixed networks, infrared, cable or Bluetooth wireless technology. As an open, future-proof standard, SyncML is the synchronization choice for any device or application of the mobile information society. For more information on SyncML, see <http://www.syncml.org/>.

Benefits of a common synchronization protocol

End users	Today's user of mobile devices probably uses a different synchronization product with every device. Each technology can synchronize only a few applications, or is limited to a particular type of network connection. This arrangement is expensive to install, confusing to configure and operate, and costly to administer. With SyncML, users will be able to buy devices that synchronize with a broader range of data.
Device manufacturers	Device manufacturers will benefit from a common protocol that will make the device interoperable with a broader range of applications, services, and network and transmission technologies
Service providers	Service providers moving into the growth arena of application hosting are particularly concerned that a proliferation of synchronization technologies will make it impossible to deploy and support their customers in a cost-effective manner. To support the range of data types and devices in use today, service providers must install and configure multiple server infrastructures, maintain and support that infrastructure, and maintain compatibility and performance. The alternative now available, to use a single solution for data connectivity, involves the risk of a tight coupling to a propriety solution. With SyncML, they will be able to provide connectivity to a wider selection of applications.
Application developers	Choosing to support multiple synchronization technologies enables an application to support more types of devices and networked data, but that choice comes at a cost. With SyncML, application developers will be able to develop an application that can connect to a more diverse set of devices and network data.
Network operators	As multiple applications that need remote synchronization over WAP are developed, there will be an automatic growth of revenue for network operators.

Which information can be synchronized?

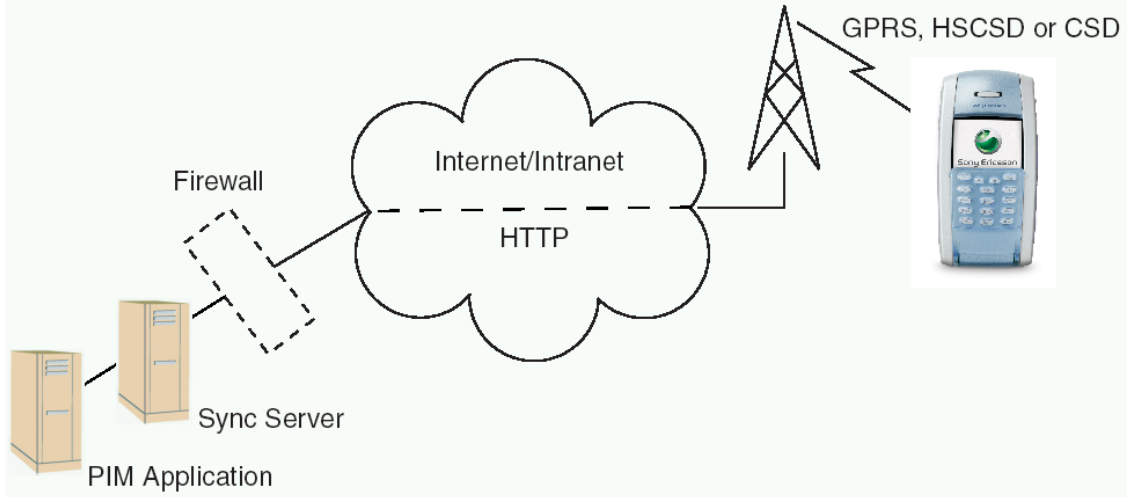
The P800 supports synchronisation of the following data types:

Application	Remote	Local
Contacts	✓	✓
Calendar	✓	✓
Tasks	✓	✓
Jotter (notes)		✓
E-Mail	**	✓

** Note that E-Mail can of course be fetched remotely using the Messaging application.

Remote Synchronisation

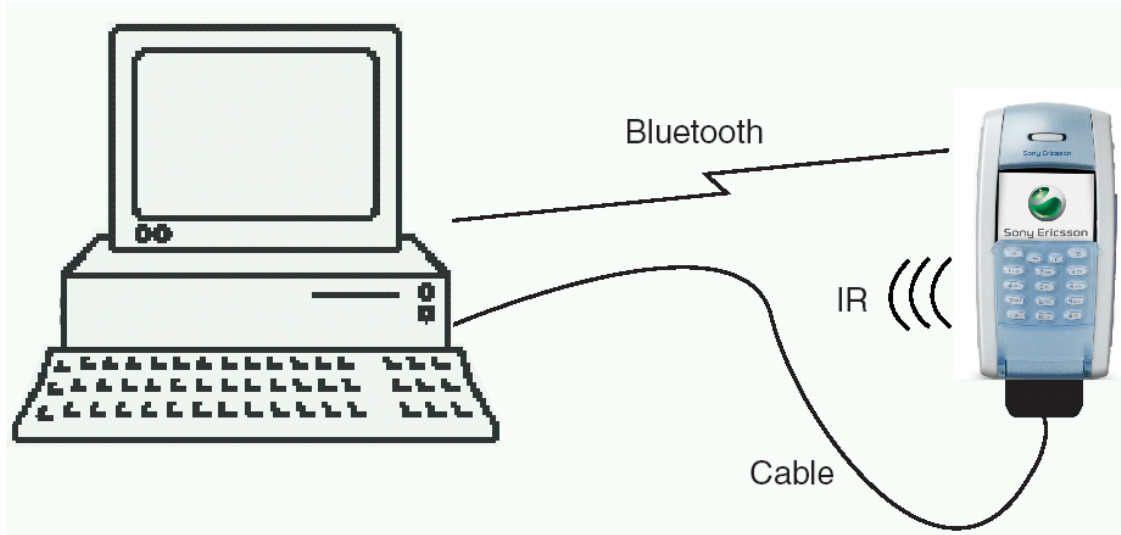
Remote synchronisation takes place over the air using HTTP and is the ideal way to keep the P800 up to date. Using GPRS, the P800 can be continuously connected to the remote synchronisation server.



Synchronisation services will be offered by mobile operators, third-party service providers and as added capability to corporate PIM applications. Corporate PIM applications such as Microsoft[®] Exchange and Lotus[®] Notes[®] can be supplemented with SyncML capability.

Local Synchronisation

The P800 is supplied with PC software for local synchronisation. It may be loaded from the CD-ROM.



Bluetooth, Infrared or Cable

The P800 synchronizes using the same protocol, regardless of connection type. It connects via Bluetooth wireless technology, infrared or cable. The cable is connected either directly to the phone or to the desktop charger.

Automatic synchronization

Synchronisation can be configured to start automatically, given that a suitable synchronization program must be running on the other device:

- When the USB cable is plugged in to the P800.
- When the P800 is placed in to the desk stand, and the desk stand is connected to the other device.
- When Bluetooth is activated on both devices and they come into operating range
- When infrared is activated on both devices and the infrared sensors are aligned.

Intelligent process

A synchronization engine performs the task of synchronizing. For local synchronization, the synchronization engine is an application that runs on the desktop computer. The synchronization engine compares, updates and resolves conflicts to ensure that the information in the phone is the same as that in the computer.

Compatibility

The supplied PC software enables synchronisation with the following applications:

- Lotus[®] Organizer[®] 5 & 6
- Lotus[®] Notes[®] 4.6, 5.0
- Microsoft[®] Outlook[®] 98, 2000, 2002

The PC requirements are as follows:

- Microsoft[®] Windows[®] 2000, Me, XP
- Minimum recommended hardware configuration for the version of Windows in use.
- 30Mb free space on hard disk

File Transfer Utility

A utility is provided which enables files to be transferred to and from a P800 connected to a PC. Typical uses for this include:

- Archiving pictures taken on the P800 to PC storage
- Moving images to the P800 to use in customisation, MMS messages etc.
- Moving sound clips to the P800 for customisation
- Store work documents (Word, Excel etc) on the P800 to read whilst on the move.
- Moving data to and from third party applications, for example maps.

Backup and Restore

The local synchronisation software includes a backup and restore utility. Backup is initiated from the connected PC. Files in the user data area (which includes loaded third party applications) are backed up to PC storage.

The restore utility takes stored data from the PC and places it back on to the P800.

Language Change Utility

The P800 has a larger, richer MMI compared to an ordinary mobile phone. Applications often have help information also. Consequently, it is impractical to store many languages on the P800 at the same time. To facilitate language change, a PC utility is provided which enables the required language to be loaded on to the P800.

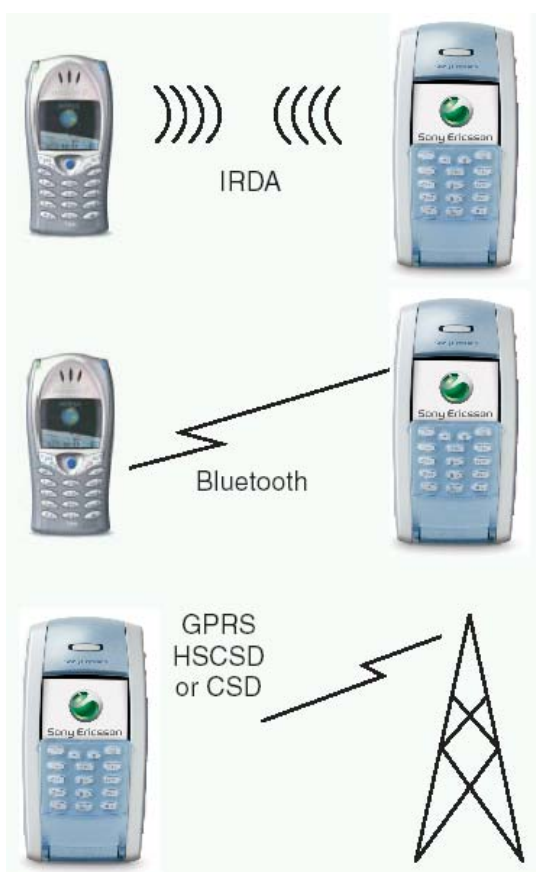
Object Exchange – ‘Send As’

The P800 makes it possible to transfer objects over Bluetooth, infrared and Messaging. This is presented to the user via ‘Send As’ commands in applications. Simply select an item such as a contact, select ‘Send As’ and select the method to be used for sending. Typical applications are to beam an appointment to other people, or to receive a new background image.

Application (Data Type)	Bearer >	IR	Bluetooth	SMS	MMS	E-Mail
Contact (vCard)		✓	✓	✓	✓	✓
Appointment (vCal)		✓	✓	✓	✓	✓
Tasks (vCal)		✓	✓	✓	✓	✓
Jotter		✓	✓	✓	✓**	✓
Image		✓	✓		✓	✓
Sound Clip (Ringtone)		✓	✓		✓	✓
Bookmark		✓	✓	✓	✓	✓
Voice Memo (Voice Notes)		✓	✓		✓	✓
Third Party Applications (‘Send As’ API)		✓	✓	✓	✓	✓

** Both the text and the drawing are sent via MMS

Note that the P800 messaging application enables the user to add objects into EMS and MMS messages. See Messaging section.



To perform a ‘Send As’ beam operation using infrared, the two devices are lined up and the sender initiates the transfer.

To beam over Bluetooth, a scan finds the other devices within range. The user can then select the required device and send the information across.

When sending over SMS, MMS or E-Mail, the required message type is created with the selected object attached. It is then sent over the air.

GPRS, HSCSD and CSD Connections

The introduction of GPRS (General Packet Radio Services) is one of the key steps in the evolution of today's GSM networks for enhancing the capabilities of data communication. Data traffic is increasing enormously (over both wired and wireless networks), with the growth in demand for Internet access and services paralleling that for mobile communications. Users want access to the Internet while they are away from their offices and homes, and surveys have found that the vast majority of business professionals want the ability to send and receive E-Mail, browse the Web and transmit text and graphics on a portable device. That is why the main applications driving Mobile Internet development are E-Mail clients and Web browsers.

The demand for high-speed Internet access will be the key driver for coming generations of wireless services, and GPRS can deliver the necessary speed. GPRS allows innovative services to be created, enabling new and previously inaccessible market segments to be addressed and increasing customer loyalty.

GPRS applications can be developed as both horizontal and vertical. Vertical applications are specific, including those for operations such as reaching police and emergency, taxi, delivery or automated services (vending machines, supervision, vehicle tracking). Horizontal applications are more generic and include those for Internet access, E-Mail, messaging, e-commerce and entertainment.

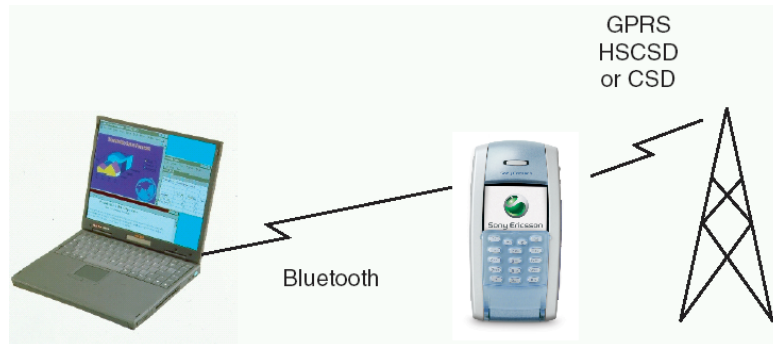
GPRS is able to take advantage of the global coverage of existing GSM networks. Applications developed for GPRS can be deployed on a large scale and can reap the associated benefits. GPRS also provides a secure medium for connections to private networks, banking and financial services.

The P800 supports connection to the internet, company intranets and mobile operator WAP services over GPRS, HSCSD and CSD. These will be explained in more detail later in this paper. A typical configuration will be to use GPRS for a continuous connection to the net. With GPRS, the P800 sends data in "packets" at a very high speed. The P800 remains connected to the network at all times, using transmission capacity only when data are sent or received. This enables E-Mail to be automatically fetched, whilst the browser is always available for immediate use. Third Party applications such as instant messaging clients will also benefit from a GPRS 'always on' connection.

Using the P800 as a Modem

The P800 contains a complete GSM/GPRS modem enabling it to be used to connect external devices such as laptop PCs to the internet or corporate intranet. The P800 is connected to the laptop using infrared, Bluetooth or cable, and will connect over the air using GPRS, HSCSD or CSD.

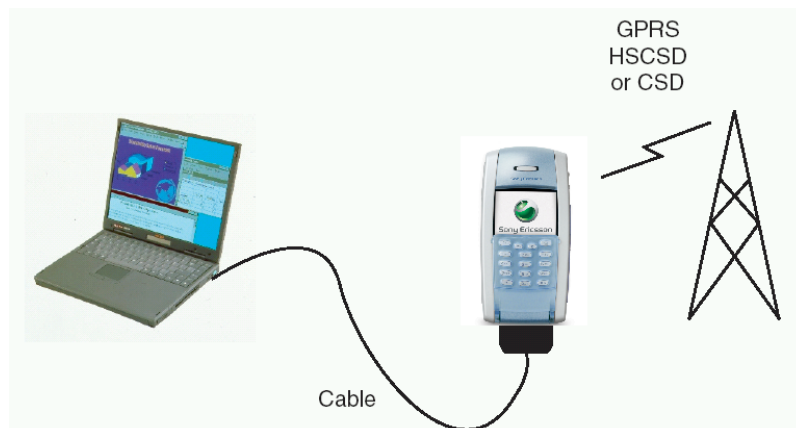
The P800 appears to the laptop like a normal modem, having an AT command set compatible with industry de facto extensions, ETSI 07.05 and 07.07. A Windows modem driver file is supplied on the CD-ROM.



Once paired with a Bluetooth-enabled laptop, the P800 is ready to make an immediate connection to the Internet or corporate network. Because Bluetooth is wire-free and requires no line-of-sight alignment, laptop can be positioned for maximum comfort whilst the P800 can remain in a jacket pocket, briefcase or even be placed up to 10 metres away to get optimal reception.



Infrared may also be used to link the P800 with other devices. Range is typically up to 1 metre. The two infrared 'eyes' must be kept in line of sight, at an angle of no more than approximately 30 degrees.



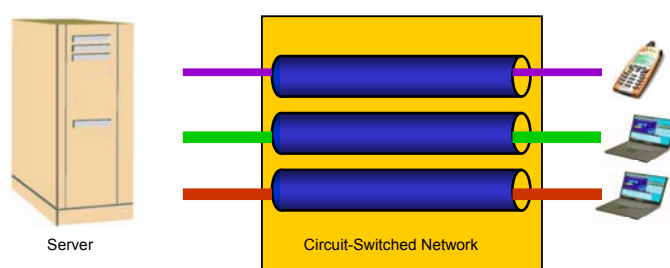
Or a USB cable may be used.

Technical Explanation of CSD, HSCSD and GPRS

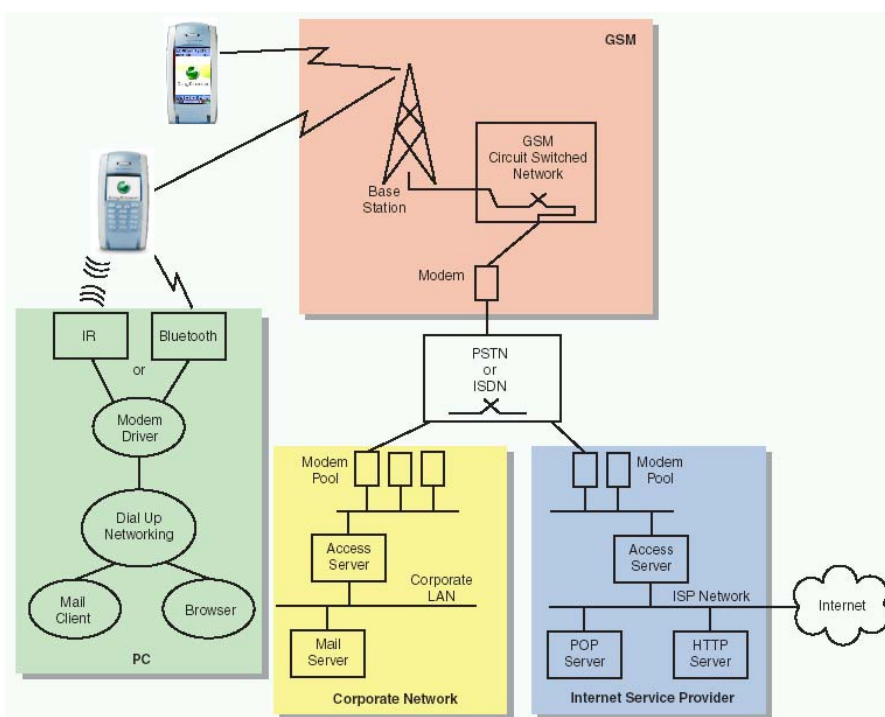
This section provides an overview of the way data communication works in a GSM network environment. This will help you to understand the characteristics of the different solutions supported by the P800 and the parameters which govern the data transmission speeds available.

Circuit Switched Data (CSD)

A modem and landline is a common way to connect to the internet and company networks. The modem establishes a telephone call to the remote server which is 'circuit-switched', meaning that a telephone circuit is maintained for the duration of the connection, irrespective of whether data flows or not. The connection has a fixed bandwidth and is normally charged on a connected-time basis.

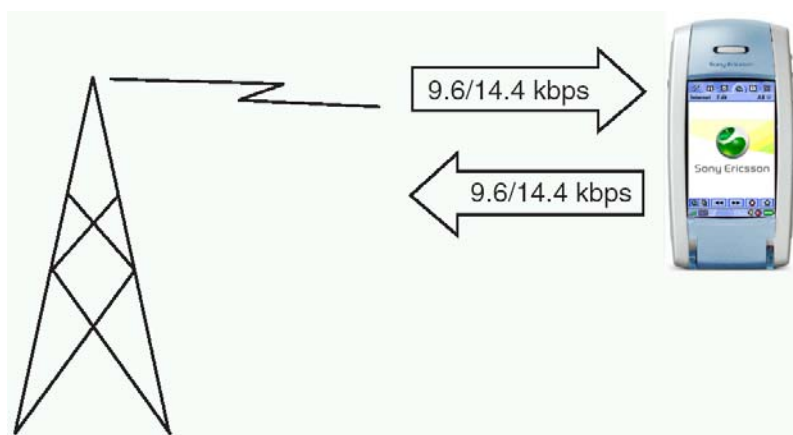


In GSM networks, this facility is widely available and is called Circuit Switched Data (CSD). It is very similar to using a modem, but is subject to lower data transmission speeds due to the connection taking place over the GSM wireless network. The standard speed of operation for CSD is 9.6kbps transmit and receive. 14.4kbps is available in some GSM networks. The P800 will operate at the higher speed where it is available.



The above diagram shows an end-to-end overview of a circuit switched data call via the GSM network. When establishing a data call, the P800 will be connected via the GSM network to what you may think of as a 'modem' within the network, rather like the GSM network is acting as a wireless RS232 cable. The modem makes a PSTN or ISDN call to the Point Of Presence telephone number of the required resource, for example your Internet Service Provider or company modem pool for intranet access. Since the modem in the GSM network operates to common standards, no special configuration is required at the ISP or company remote access servers. The limitation on transmission speed (9.6kbps or 14.4kbps) is due to the lower bandwidth of the wireless connection from the P800 to the modem.

As well as making data calls itself (built-in E-Mail, browsing and other applications), the P800 may be connected to a PC using infrared or Bluetooth. In this case it acts like a modem. Either way, a standard CSD call is limited to 9.6kbps or 14.4kbps.

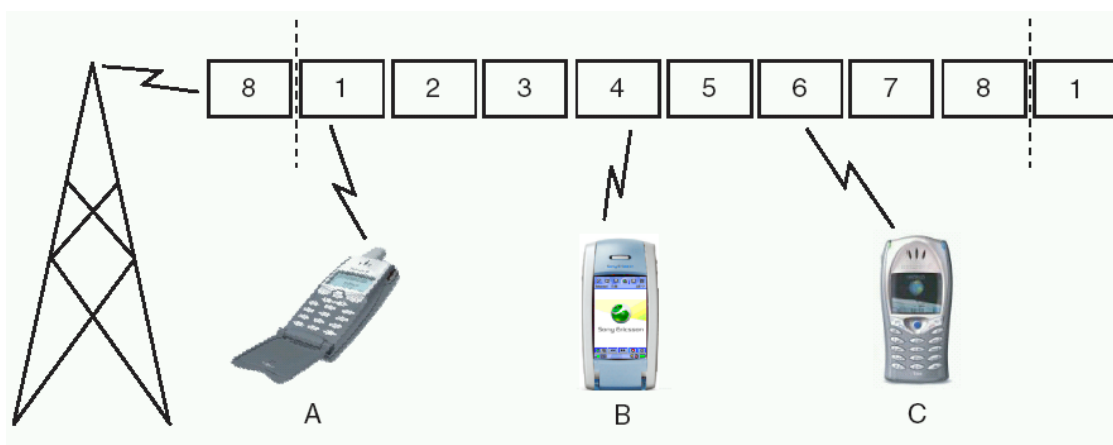


High Speed Circuit Switched Data (HSCSD)

HSCSD operates in a similar manner to CSD, but allocates more radio capacity between the P800 and base station in order to increase the overall speed of the connection. Some explanation of the GSM system will help explain the characteristics of HSCSD.

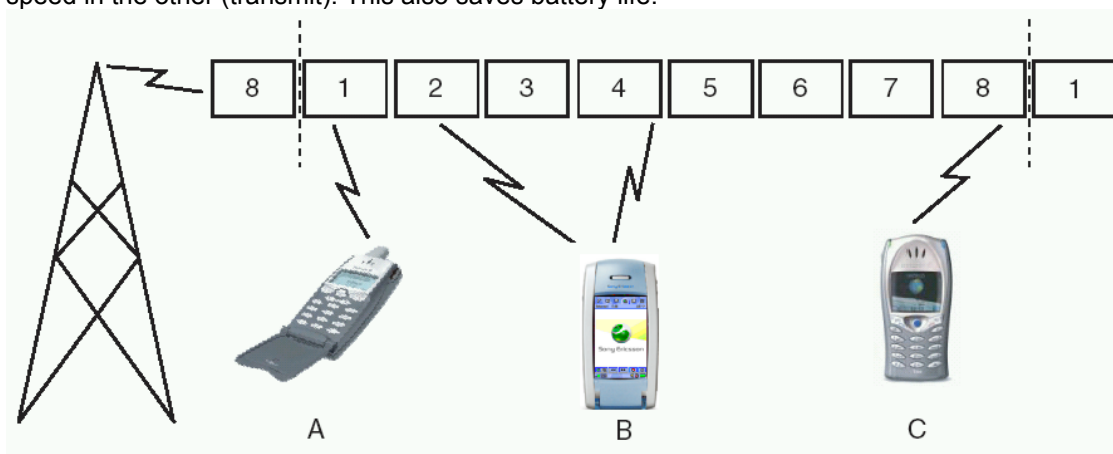
A GSM mobile phone making a voice call will digitise the speech into a very efficient compressed data stream. One radio channel has enough capacity to carry 8 of these data streams, so the channel is divided into 8 repeating timeslots. The phone is allocated a radio channel and timeslot and will send the data stream in bursts over that channel. Other phones in the cell may make use of the other timeslots in the channel. A separate receive channel and timeslot is allocated and works in the same way.

When making a CSD call, the data is similarly sent in bursts over one of the 8 timeslots in the transmit channel. The basic data rate of this transmission is 9.6kbps, but some networks are upgraded to a data rate of 14.4kbps.



In the above example, terminal A is a phone using one timeslot for a voice call, terminal B is a P800 using one timeslot for a CSD data call and terminal C is a phone using one timeslot for a CSD WAP session. In each case, the timeslot is allocated whether data is transmitted or not.

In order to achieve higher data rates, the GSM terminal may be allocated more timeslots within the transmit and receive channels. Since common applications such as browsing benefit from having high data receive rates without requiring high transmit rates, HSCSD configurations are typically *asymmetric*, meaning that data speed in one direction (receive) is higher than the data speed in the other (transmit). This also saves battery life.



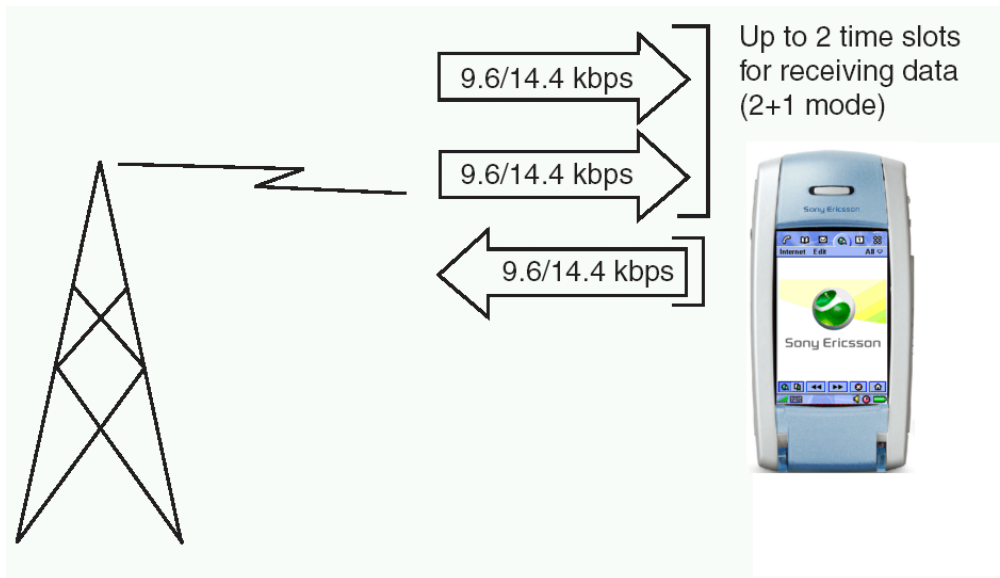
The slot allocation and hence the speed is set by the GSM network when the call is initiated, and may be dynamically altered depending on network conditions such as the number of active users in each cell. In the above example, the P800 (terminal B) has been allocated 2 receive timeslots.

The HSCSD maximum data rates (kbps) using the P800 are shown below.

	9.6kbps per timeslot	14.4kbps per timeslot
Rx	19.2	28.8
Tx	9.6	14.4

The timeslot usage is not linked to demand from applications – an HSCSD connection will be maintained even if no data is flowing. The data 'pipe' is (as far as practicable) maintained fully open for you whether data flows or not. HSCSD connections are typically charged by connection duration in the same way as CSD calls.

Here is a summary of the slot usages in HSCSD. One 'uplink' and 1 to 2 'downlinks'.

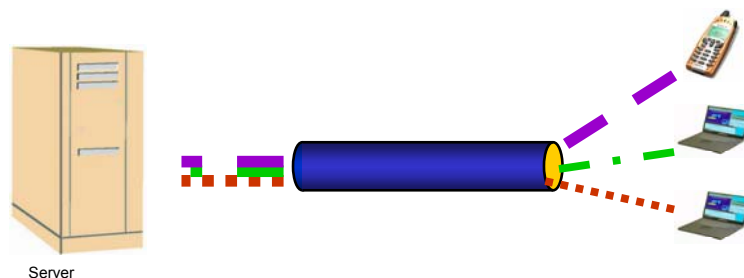


Analogue and ISDN (V110) Bearer Service Types

CSD and HSCSD are capable of Analogue and, where supported by the mobile operator, ISDN connections. ISDN offers faster call set-up time and can increase the performance of an HSCSD connection due to the limitations in analogue modem technology. The simplest option is to test ISDN bearer mode, and switch to analogue if no connection can be made. Note that due to network limitations, analogue is often the only bearer that works when the user is roaming.

GPRS

GPRS mode combines the speed advantages of multi-timeslot working with packet data efficiency. Instead of utilizing a constant stream of timeslots in a circuit-switched call, GPRS mode sends/receives data in small packets, as needed, much like IP on the internet. Capacity is only used when data is being sent or received, which means that it is possible to be "constantly" connected so that applications have immediate access to networked servers. The radio resources are shared between users in a much more efficient way than is possible using circuit-switched methods – timeslots are dynamically allocated to those users who are transmitting and receiving data. The service is typically charged by the amount of data transferred.



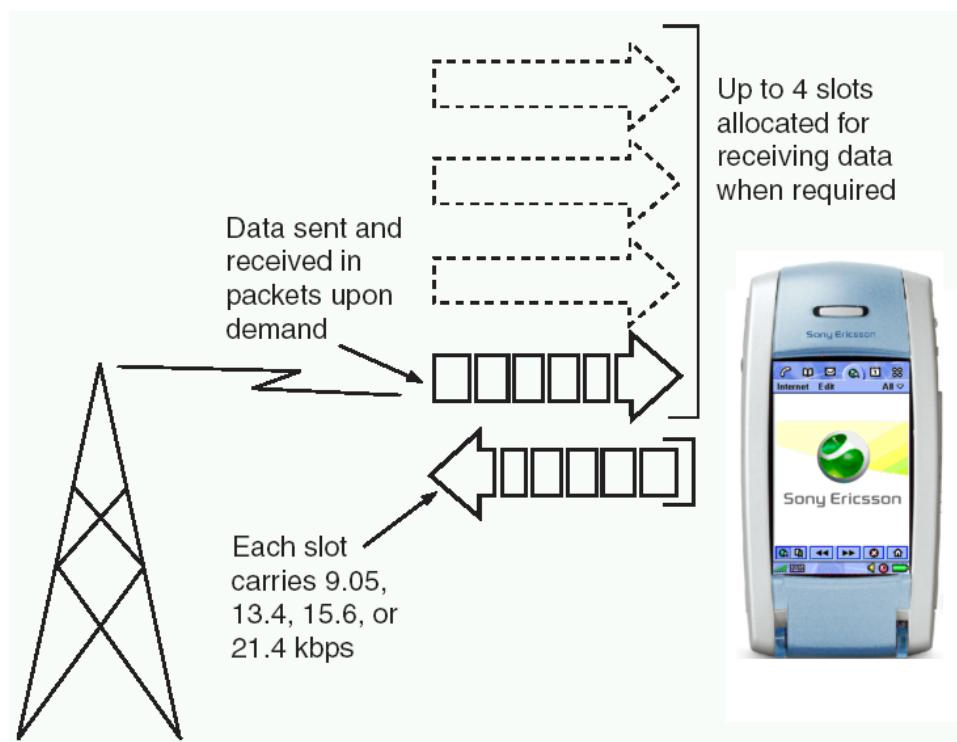
Connection set-up is fast and the P800 will normally be left connected for the whole time it is switched on. When applications need to transfer large amounts of data such as files, images etc, it is possible to increase bandwidth by using more timeslots for the duration of the transfer. The

P800 supports up to 4+1 timeslots receive + transmit. The GSM network will dynamically allocate timeslot resources depending on current network conditions.

The capacity of each timeslot depends on the network and four coding schemes are defined, CS-1 to CS-4. These are different to the capacities in HSCSD due to the differences between circuit-switched and packet data operation. GPRS networks are typically launched using CS-1 and CS-2 only, limiting maximum speeds to those shown in **bold** below. The P800 supports CS-3 and CS-4 and will operate at the higher speeds where introduced by mobile operators.

	CS-1 9.05kbps	CS-2 13.4kbps	CS-3 15.6kbps	CS-4 21.4kbps
Rx	36.2	53.6	62.4	85.6
Tx	9.05	13.4	15.6	21.4

The diagram below shows how the P800 in GPRS mode will send data in packets, combining timeslots when extra bandwidth is required, up to a maximum of 4 for received data and 1 for transmitted data



Applications such as Messaging and the integrated browser will automatically initiate CSD, HSCSD and GPRS connections, warning you if your desired action requires another connection to be cut. Whilst a CSD/HSCSD connection is terminated after the transaction or a period of inactivity, the GPRS connection will be maintained. This means that, for example, Web and WAP pages may be browsed without any connect delay, and that the E-Mail client can automatically poll for new messages.

When using the P800 as a modem to a PC, the GPRS connection is initiated from the PC as usual by selecting a Windows® DUN connection, either explicitly within the DUN folder or implicitly via the usual way that Windows enables applications to request connections. Where a GPRS connection is defined in the DUN entry, the P800 will initiate a GPRS attach and connect to the GPRS network.

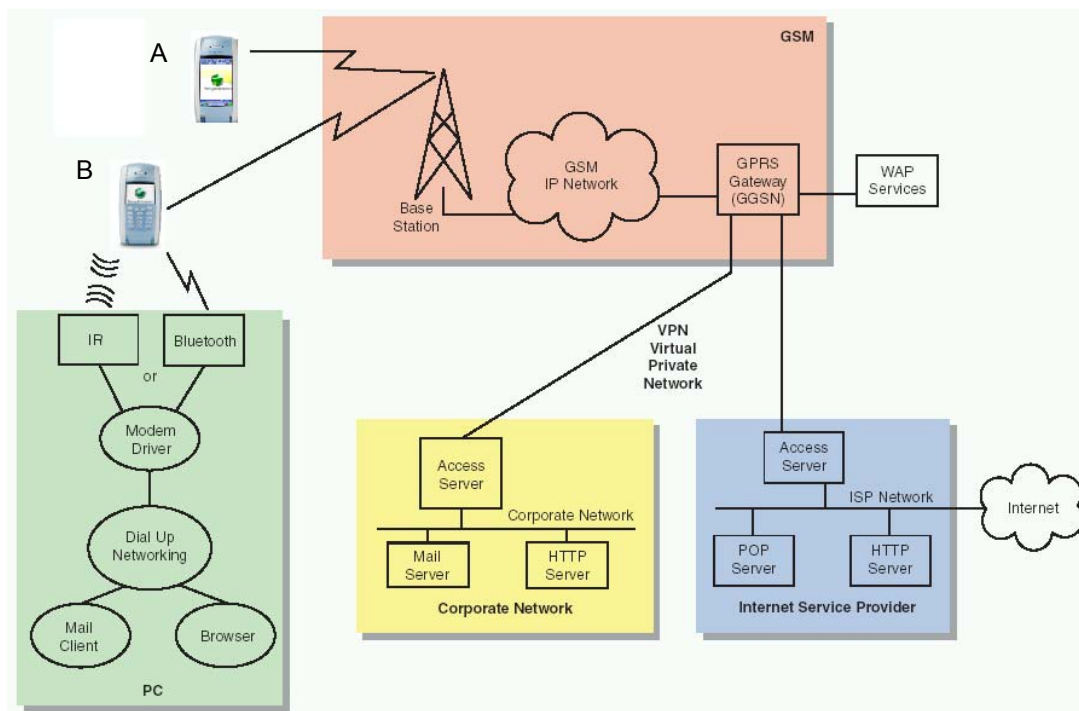
The required GPRS server resource is defined by an Access Point Name (APN) rather than a telephone number. Example APNs might be

- | | |
|------------------------------|---|
| Corporation.operator.country | Connect to your corporate intranet via a VPN |
| Internet.operator.country | Connect to internet via the mobile operator's ISP |
| Wap.operator.country | Connect to the mobile operator's WAP service |

The Access Server in the GSM/GPRS network will make the connection to the requested resource. Access control and security is performed using standard components such as Radius servers.

Once connected, the user may simply leave the connection in place and access the remote resources as and when required.

The diagram below shows the end-end connection route for a GPRS connection. The P800 and PC ends are the same as before. The mobile operator is enabled to provide direct packet data access to WAP and internet resources. By establishing a suitable Virtual Private Network (VPN) connection to the corporate network, it is possible for the mobile user to access corporate intranet facilities. Your mobile operator will be able to advise you on the available VPN options. Typical methods are IPsec tunnelling over the internet, leased line and frame relay.



The P800 (A) is connected to the Internet Service Provider and may browse the web and check mail. This connection is left open, enabling the mailserv to be polled periodically.

Using the P800 as a modem (B), it may be linked to a laptop PC using either infrared or Bluetooth. A GPRS connection can be made to the corporate network enabling intranet and mail services to be accessed.

The P800 may also be configured to access the corporate network directly using the built-in Browser and Messaging applications.

P800c/P802 In Detail

This section provides more information about the extra features of the P800c/P802 and the differences when compared to the P800.

Product Name and Languages

Market	Product Name	Default Language for MMI, Dictionary and printed manual	Alternative MMI Language
China	P802	Simplified Chinese (ZS)	English (EN)
Hong Kong	P800c	Traditional Chinese Hong Kong (ZH)	English (EN)
Taiwan	P800c	Traditional Chinese Taiwan (ZT)	English (EN)

There are basically two written languages of Chinese – Traditional and Simplified. Traditional Chinese is used in Taiwan, with a variant in Hong Kong. Simplified Chinese is primarily used in the People's Republic of China (PRC). British English is available as an alternative.

Input Methods

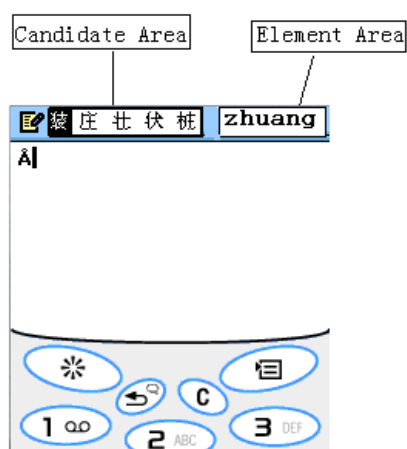
Market	Product Name	Flip Keys	Default Input Method	Alternative Input Method
China	P802	Strokes	Pinyin	Strokes
Hong Kong	P800c	Strokes	Strokes	Pinyin
Taiwan	P800c	BoPoMoFo	BoPoMoFo	Strokes

Strokes is an input method based on the basic building blocks of Chinese characters. A Stroke is a component of a Chinese character written with one motion of the brush to paper.

Pinyin is a method of writing down the pronunciation of Chinese characters using the letters of the Latin alphabet, according to rules that have been standardised in the PRC.

BoPoMoFo is a method of writing Chinese characters using letters of the Chinese phonetic alphabet. This method is also known as Zhuyin and is mainly used in Taiwan.

FC Character Input



There are two different flip designs, one with Strokes and one with BoPoMoFo characters. Latin characters (a, b, c...) are included on both. Pressing the * key enables the user to switch between available input methods.

Elements are entered using keys 1-9 and matching Chinese characters are displayed in the candidate area. The Jog Dial may be used to assist in character selection.

FO Character Input

Virtual Keyboard

Virtual keyboards are provided to enable the user to input elements. The top area is where selected characters are displayed to make up the sentence. An element display area shows the selected element(s). Candidates are displayed within a candidates area, and may be selected.



Pinyin Virtual Keyboard.
Includes an elements and a candidate display area.



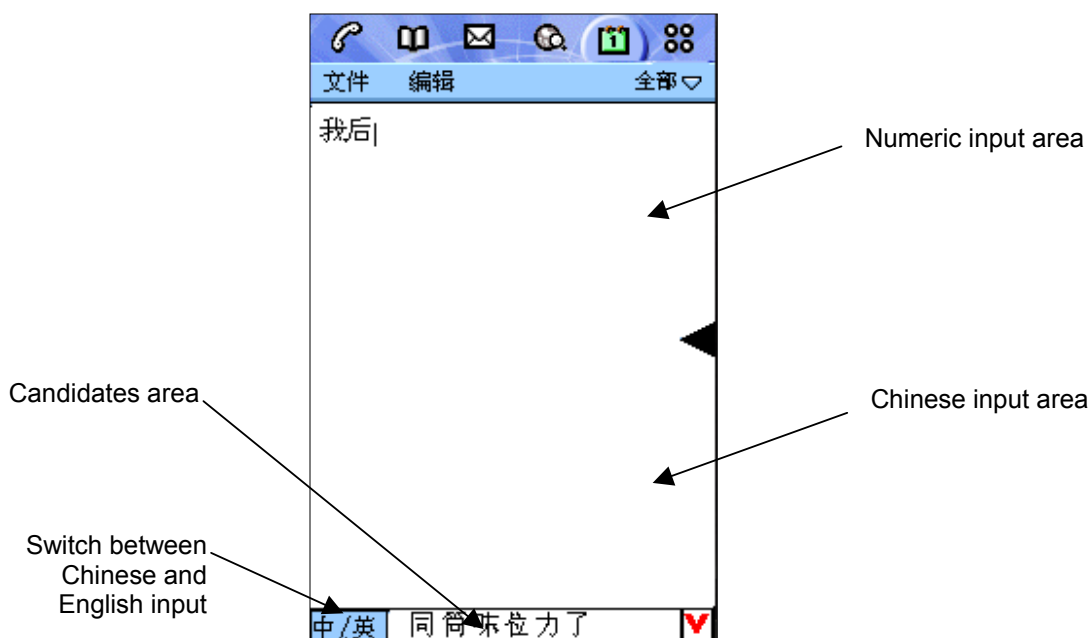
Strokes Virtual Keyboard.
Includes a components area



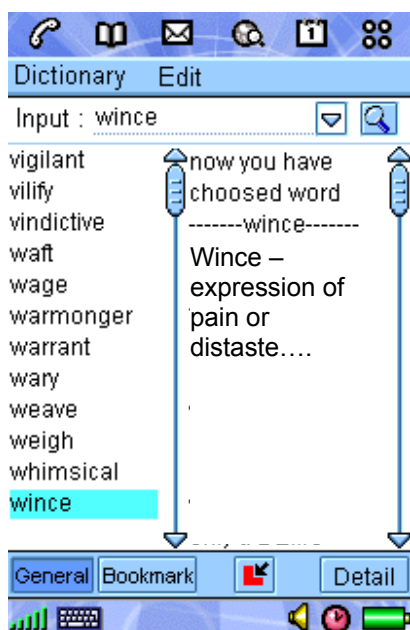
BoPoMoFo Virtual Keyboard.
Includes an elements and a candidate display area.

Handwriting Recognition

The user writes text directly on to the screen. The shapes drawn persist until the character is interpreted. Simplified Chinese is supported on the P802 and Traditional Chinese on the P800c.



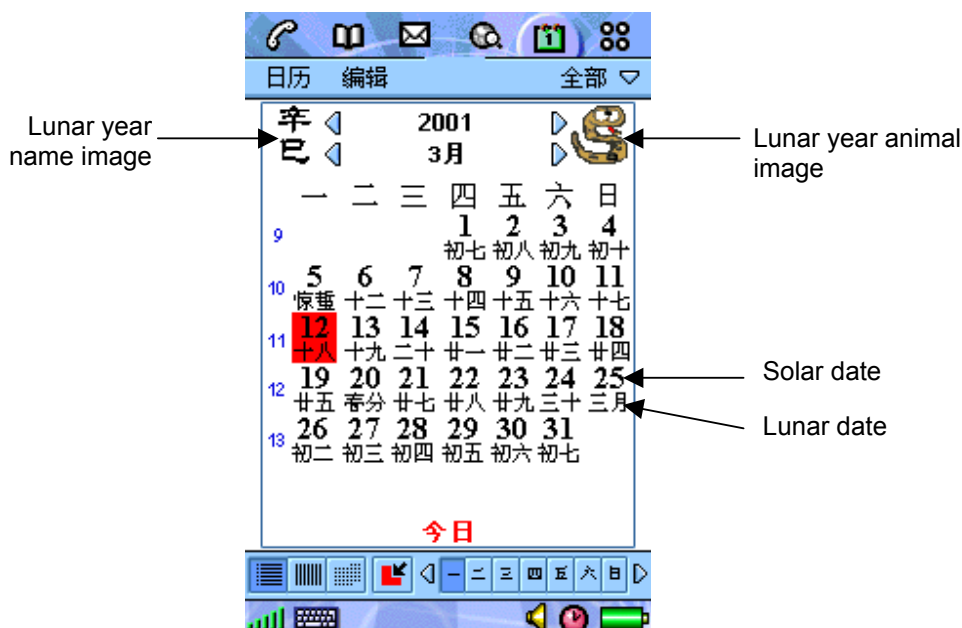
Chinese Dictionary



The P802 has a standalone Chinese-English / English-Chinese dictionary. Both Traditional and Simplified Chinese versions are supplied on the CD-ROM. The user may load the version required.

Lunar Calendar

The P802 has two calendars, one based on the Western solar calendar system and one based on the Chinese lunar system. Before the solar calendar was adopted, China exclusively followed a lunar to decide the times of planting, harvesting and festival occasions. Today the solar calendar is used for most practical matters of daily life but the lunar calendar is still important because it determines numerous seasonal holidays such as the Traditional New Year. When Chinese is the selected language, the lunar calendar is the default.

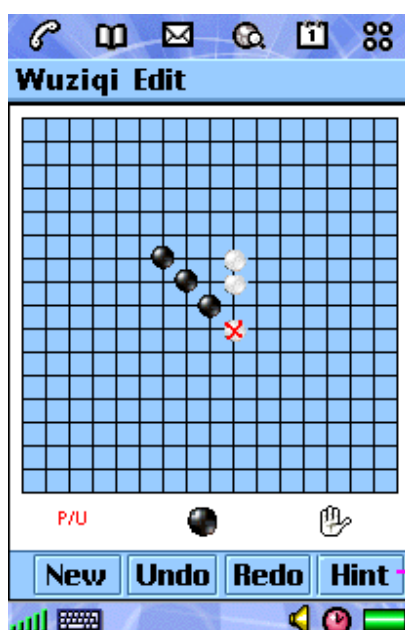


Contacts

Chinese and English names are grouped separately. Chinese names may be sorted by Pinyin, Stroke or BoPoMoFo (depending which two of these are present).

WuZiQi – Five Stone Chess

The P802 has a well-known Chinese game called WuZiQi. The name means 'Five Stone Chess' and the goal is to get five stones in one line. The other games on the P802 are Chess and Solitaire. Further games will be provided on the P802 CD-ROM.



User Storage

The Chinese MMI and input methods need more storage space compared to the Latin character version. User storage space for messages, dictionary, applications, contacts, images etc is therefore reduced to 9Mbytes in the P802 (compared to 12Mbyte in the P800).

SIM Application Toolkit

SIM Application Toolkit (SIM-AT) is a method of developing small applications for mobile phones. User interaction is via the screen and keyboard, whilst connectivity is provided by means of SMS and USSD transports. SIM-AT can also be used to initiate phone calls. A typical application is to provide a simple menu-based interface to value-added services provided by the mobile operator. The application is stored and distributed on the SIM card. SIM-AT offers a powerful way to deploy programs and services to users, without the need for new or upgraded equipment. All necessary set-up and programming is distributed to users over the air, directly to their phones.

The P800 supports SIM-AT according to GSM 11.14 in order to protect investment in SIM-AT based applications and to enable users to continue using the services and applications on their SIM cards. The applications are accessed from within the MMI of the P800's Phone application.

The P800 also has much richer application environments including WAP, Web, C++ and Java. These enable applications to be created with a much better MMI and superior connectivity such as TCP/IP over the internet.

SIM-AT Services supported by the P800

Service	Description
CALL CONTROL	This will enable the SIM to allow, bar or modify a call (supplementary service operation or USSD operation).
DISPLAY TEXT	Text is displayed on the screen according to the request from the SIM application: Priority: Normal, High Clear Message: Automatic after delay, Wait for user. Alphabet: UCS2, packed and unpacked SMS default
EVENT DOWNLOAD	The Event Download enables the ME to report on events to the SIM: <ul style="list-style-type: none"> • Location Status • Idle Screen Available • Language Selection • Call Connected • Call Disconnected • Browser Termination
GET INKEY	Request the user to enter a single character. <ul style="list-style-type: none"> • 0-9 *# + only or alphabet set • SMS default or UCS2 character set
GET INPUT	Request the user to enter a number of characters. <ul style="list-style-type: none"> • 0-9 *# + only or alphabet set • SMS default or UCS2 character set • Input echoed or secret • Packed or unpacked.
LAUNCH BROWSER	The P800 will launch the integrated browser.
PLAY TONE	Play supervisory tones (e.g. Dial tone, Busy tone) as defined in GSM 02.40.

PROFILE DOWNLOAD	Profile downloading provides a mechanism for the ME to tell the SIM what it is capable of.
PROVIDE LOCAL INFORMATION	Send current known locality information to the SIM: <ul style="list-style-type: none">• MCC, MNC, LAC and Cell Identity• IMEI• Network Measurement Results• Date, time and time zone• Language Setting• Timing Advance
REFRESH	The Refresh command enables the SIM to inform the P800 that data on the SIM has changed and the P800 needs to be updated: <ul style="list-style-type: none">• SIM Initialisation and Full File Change Notification• File Change Notification• SIM Initialisation and File Change Notification• SIM Initialisation• SIM reset
SEND DTMF	If there is an active call, play the requested DTMF tone(s) down the line.
SEND SHORT MESSAGE	Send an SMS containing data provided by the application. <ul style="list-style-type: none">• Packing by the ME if required
SEND SS	Send an SS request to the network.
SEND USSD	Send a USSD request to the network.
SET UP CALL	Set up a voice call: <ul style="list-style-type: none">• If not currently busy on another call• If not currently busy on another call, with redial• Putting all calls (if any) on hold• Putting all calls (if any) on hold, with redial• Disconnecting all other calls• Disconnecting all other calls, with redial
SET UP EVENT LIST	The SIM supplies a list of events to the P800. When one of these events occurs, the details will be provided to the SIM: <ul style="list-style-type: none">• Location Status• Idle screen available• Language selection• Call Connected• Call Disconnected• Browser Termination
SET UP IDLE MODE TEXT	The P800 displays text from the SIM on the phone's idle screen.

Consumer Kit and CD-ROM

DPY Kit Contents

The following accessories & components shall be in the DPY:

- 1 KRC P800 with a stylus
- 1 Box
- 1 Insert
- 1 SyncStation™, KRY 105 183
- 1 Pouch, KRY 101 1110
- 2 Spare styli
- 1 Hinge Protector (for flip-removed)
- 1 Strap
- 1 Mono headset, KRY 105 184
- 1 CD-ROM, System & Applications
- 1-2 Manuals
- 1 Accessory & Applications Leaflet
- 1 Warranty Card
- 1 Battery, BKB 193 148/1
- 1 Travel Charger 'Magnus' CST-13 (R1)



Language Support

The P800/P802 is delivered with all of the applicable languages loaded. When the phone is first used, the user has the opportunity to select the required language and delete the rest (except English) in order to make free more user storage. Should the user wish to change the language at a later stage, this may be done via the PC software. The required language is loaded from the CD-ROM into the P800 and becomes available next time the P800 is switched on. A simple MMI for this process is provided within the supplied PC software.

Note: For the CD-ROM, only UK English shall be available at launch. The rest of the languages shall be available at <http://www.sonyericsson.com/> as soon as they are ready.

The Getting Started instruction shall be in all supported languages.

The following will be supplied in UK English only: global warranty card, global warranty conditions statement, licence agreements, accessories and applications leaflet.

P800 Standard Version

Language support (Latin character set) for the P800 is as follows:

- Danish (DA)
- Dutch (NL)
- English UK
- English US
- Finnish (FI)
- French (FR)
- German (DE)
- Greek (EL)
- Italian (IT)
- Latin American English (R1)
- Norwegian (NO)
- Portuguese (PT)
- Spanish (ES)
- Swedish (SV)
- Turkish (TR)



P800c/P802 Chinese Version

Product Name and Languages

Market	Product Name	Default Language for MMI, Dictionary and printed manual	Alternative MMI Language
China	P802	Simplified Chinese (ZS)	English (EN)
Hong Kong	P800c	Traditional Chinese Hong Kong (ZH)	English (EN)
Taiwan	P800c	Traditional Chinese Taiwan (ZT)	English (EN)

Input Methods

Market	Product Name	Flip Keys	Default Input Method	Alternative Input Method
China	P802	Strokes	Pinyin	Strokes
Hong Kong	P800c	Strokes	Strokes	Pinyin
Taiwan	P800c	BoPoMoFo	BoPoMoFo	Strokes

CD-ROM Contents

Local Synchronisation	PC software for synchronising PIM data between the P800 and PC applications such as Microsoft® Outlook® and Lotus® Notes®. Described elsewhere in this paper.
Backup and Restore	Utility to back up the data from the P800 for storage on a PC. Restore enables data to be returned to the P800, for example, after a software upgrade.
File Transfer Utility	PC based utility enabling files to be moved to and from the P800. Typically used for moving picture and sound clips to the P800 and archiving pictures from the P800 to a PC for storage.
Language Change Utility	Enables the user to load a different language from the CD-ROM and switch the P800 MMI to that language..
Chinese Dictionaries	(P802 only) Standalone dictionary for looking up Chinese words. Traditional Chinese and Simplified Chinese versions supplied.
Modem Driver file	.inf file enabling the P800 to be configured to the PC as a data modem.
Manuals	Complete set of user manuals in UK English. Acrobat® PDF format.
Reference Guides	Reference Guide in each of the supported languages
Tutorial	Video showing how to use key features.
Games	Additional games for the user to load on to the P800.

Terminology and Abbreviations

3G

Generic term for the third generation mobile systems which will offer voice and faster data services compared to today's 2G (e.g. GSM) and '2.5G' (e.g. GPRS) solutions.

3GPP

3rd Generation Partnership Project. Collaboration between a number of telecommunications standards bodies to specify 3G. 3GPP also maintains and develops the specifications for GSM.

AMR

Adaptive Multi-Rate. 3GPP standard for speech coding (compression).

AU, .au

Format for audio data files.

AWT

Abstract Windowing Toolkit. A Java Graphical User Interface library.

Bearer

Path over which data flows. Specifically in CSD and HSCSD, the type of telephony link from the GSM network to the server – PSTN or ISDN.

Bluetooth

Bluetooth wireless technology is a secure, fast, point-to-multipoint radio connection technology. It is a specification for a small-form factor, low-cost radio solution providing links between mobile computers, mobile phones and other portable handheld devices, and connectivity to the internet. Available from the Bluetooth Special Interest Group (SIG), <http://www.bluetooth.com>.

Bookmark

A URL and header/title stored in the phone, enabling the user to go directly to a Web or WAP page.

bps

Bits per second – rate of data flow.

BMP

Microsoft Windows Bitmap. A graphics format defined by Microsoft supporting 1, 4, 8 or 24 bit colour depth. No compression, so files can be large.

cHTML

A version of HTML optimized for small devices.

CLDC

Connected Limited Device Configuration. The J2ME 'configuration' implemented in the P800. CLDC specifies a runtime environment with specifically limited resources, suitable for memory-constrained devices.

CLI

Calling Line Identity. Shows the number of the person calling you in your mobile phone display. The P800 will also display the name and photograph of the caller if they are in Contacts. You can then make an informed choice as to whether or not to take the call. Bear in mind that not all numbers can be displayed. To use this service, it must be supported by your network.

COM Port

Defines a serial/RS-232 port within the Windows[®] environment. May be physical (COM1 port on the rear of the PC) or virtual (COM5 port communicating with a PC card modem)

CS

Circuit Switched. Connection from A to B which has a fixed bandwidth and is maintained over a period of time, for example a voice telephone call.

CS-1 to CS-4

Coding Scheme. Determines the data rate per timeslot in GPRS.

CSD

Circuit Switched Data. CSD is a GSM service providing a CS data connection at a rate of 9.6 or 14.4kbps.

CSS

Cascading Style Sheet. A feature of browsers.

DTMF

Dual Tone Multi Frequency. A method of coding digits as a combination of two audible tones.

DUN

Dial-Up Networking.

ECML

Electronic Commerce Modelling Language.

EFR

Enhanced Full Rate, speech coding. Provides better speech quality than HR or FR.

e-GSM

Extended GSM. New frequencies specified by the European Radio Communications Committee (ERC) for GSM use when additional spectrum is needed (Network-dependent). It allows operators to transmit and receive just outside GSM's core 900MHz frequency band. This extension gives increased network capability.

EMS

Enhanced Messaging Service. An extension of SMS enabling pictures, animations, sound and text formatting to be added to text messages. 3GPP has included EMS in the standards for SMS.

E-OTD

Enhanced Observed Time Difference. A method for determining the location of a phone.

ESM

Ericsson Smart Messaging. Used for OTA configuration; an enhancement of the Nokia Smart Messaging standard.

ETSI

European Telecommunications Standards Institute. www.etsi.org

FC, FC mode

Flip Closed – used in this document to refer to the P800 with the flip closed.

FCC

Federal Communications Commission. US government agency which regulates radio communications.

FR

Full Rate, speech coding.

FO, FO mode

Flip Open. Used in this document to refer to the P800 when the flip is open.

GGSN

Gateway GPRS Support Node

GIF

Graphics Interchange Format. Format for storing images which also supports animated images. Highly compressed by limiting the colour palette to 16 or 256 colours.

GPRS

General Packet Radio Services.

GSM

Global System for Mobile Communications. GSM is the world's most widely-used digital mobile phone system, now operating in over 160 countries around the world.

GSM 900

The GSM system family includes GSM 900, GSM 1800 and GSM 1900. There are different phases of roll-out for the GSM system and GSM phones are either phase 1 or phase 2 compliant.

GSM 1800

Also known as DCS 1800 or PCN, this is a GSM digital network working on a frequency of 1800 MHz. It is used in Europe and Asia-Pacific.

GSM 1900

Also known as PCS. Refers to a GSM system running in the 1900MHz band. Used in the USA and Canada, for instance.

HR

Half Rate, speech coding.

HSCSD

High Speed Circuit Switched Data.

HTML

HyperText Markup Language.

HTTP

HyperText Transfer Protocol.

IMAP4

Internet Message Access Protocol version 4. Used to collect E-Mail from a mail server. Has more features than POP3.

IrDA

Infrared Data Association.

ISDN

Integrated Services Digital Network. Can provide circuit-switched data connections in multiples of 64 kbps.

ISP

Internet Service Provider.

J2ME

Java2 Micro Edition. An edition of the Sun Microsystems Java programming/runtime environment specifying two runtime environment 'configurations' aimed at small devices.

Java Phone

An API in Java for interacting with a phone.

JFIF

JPEG File Interchange Format

JNI

Java Native Interface

JPEG

Joint Photographic Experts Group, best known for the .JPG format for still image compression.

JVM

Java Virtual Machine

kbps

Kilobits per second – rate of data flow.

KVM

'Kilo' Virtual Machine

LAN

Local Area Network.

MBM

Audio file format on Symbian OS.

ME

Mobile Equipment. (Phone excluding SIM card)

MeT

Mobile Electronic Transactions. An initiative founded by Ericsson, Nokia and Motorola to establish a secure and consistent framework for mobile transactions.

MIDP

Mobile Information Device Profile. An API (or 'profile' in J2ME nomenclature) defined to enable a standard programming API for mobile devices. MIDP compliant applications execute in the restricted environment defined by the CLDC.

MIME

Multipurpose Internet Mail Extensions. A protocol defining how messages are sent on the internet. For example, MIME is used to describe how attachments are encoded and what type of data they contain.

MMI

Man-Machine Interface. Same as User Interface (UI)

MMS

Multimedia Messaging Service. Logical extension of SMS and EMS, MMS defines a service enabling sound, images and video to be combined into multimedia messages.

MO

Mobile Origination. For example, an SMS message sent from a mobile terminal.

MS

Mobile Station. (Phone and SIM card)

MT

Mobile Termination.

OS

Operating System, such as Symbian OS, Linux, Microsoft® Windows®.

OTA

Over-the Air Configuration. To provide settings for the phone by way of sending a message, SMS, over the network to the phone. This reduces the need for the user to configure the phone manually.

PC

Personal Computer.

PCS

Personal Communications Services, often used to describe GSM1900 networks.

PDF

Portable Document Format. A format created by Adobe for storing and distributing documents.

PDP

Packet Data Protocol.

Personal Java

An edition of Java appropriate for mobile devices such as PDAs.

Phone book

A memory in the SIM card where phone numbers can be stored and accessed by name or position.

PIM

Personal Information Management. Generic term for applications such as Contacts, Calendar, Tasks etc.

PKI

Public Key Infrastructure.

POP3

Post Office Protocol. Used to collect E-Mail from a mail server.

PSTN

Public Switched Telephone Network, for example ordinary analogue phone line for speech and/or computer modem.

PTD

Personal Trusted Device. Concept in MeT

QCIF

Quarter Common Intermediate Format. A video format size of 176 x 144 pixels.

QQVGA

Quarter Quarter VGA, 160 x 120 pixels.

QVGA

Quarter VGA size, typically refers to a portrait oriented screen 240 pixels wide x 320 pixels high.

RADIUS

Remote Access Dial-In Service. Facility at the ISP or corporation to manage remote data connections.

PDA

Personal Digital Assistant. A handheld computer having functions such as address book, calendar etc.

PNG

Portable Network Graphics. Format for storing images on file with data compression but without lowering of quality (loss of information).

RAS

Remote Access Service.

Rx

Receive

SC

Service Centre (for SMS).

SDK

Software Development Kit

Service Provider

A company that provides services and subscriptions to mobile phone users.

SIM card

Subscriber Identity Module card – a card that must be inserted in any GSM-based mobile terminal. It contains subscriber details, security information and memory for a personal directory of numbers. The card can be a small plug-in type or credit card-sized, but both types have the same functions. The P800 uses the small plug-in card.

SIM-AT

SIM Application Toolkit – a means of providing simple applications that are stored on the SIM card.

SMIL

Synchronized Multimedia Integration Language. Used by MMS to describe how media objects are to be played.

SMS

Short Message Service. Allows messages of up to 160 characters to be sent and received via the network operator's message centre to a mobile phone.

SMTP

Simple Mail Transfer Protocol. Protocol used to send E-Mail from an E-Mail client via an SMTP server.

SS

Supplementary Service

SWIM

A SWIM card is a SIM card containing a WIM

TCP/IP

Transmission Control Protocol/Internet Protocol.

TE

Terminal Equipment. Generic term for GSM terminals such as phones and PC cards.

Terminal Adaptor

Generic term for the equipment terminating a digital comms line such as an ISDN2 line. The P800 is a Terminal Adaptor since it interfaces to GSM digital data services.

TLS

Transport Layer Security. Used by Web browsers, for example.

Tx

Transmit

URL

Uniform Resource Locator. Points to a service or information on the internet, for example:
<http://www.ericsson.com/mms/demo>

USSD

Unstructured Supplementary Services Data. Narrow-band GSM data service. For example entering *79*1234# might return the stock price for stock 1234.

V.110

ETSI standard for data over an ISDN circuit.

V.120

ETSI standard for data over an ISDN circuit.

vCal; vCalendar

vCalendar defines a transport and platform-independent format for exchanging calendar and scheduling information for use in PIMs/PDAs and group schedulers. vCalendar is specified by IETF.

vCard

vCard automates the exchange of personal information typically found on a traditional business card, for use in applications such as internet mail, voice mail, Web browsers, telephony applications, call centres, video conferencing,

PIMs /PDAs, pagers, fax, office equipment, and smart cards. vCard is specified by IETF.

VGA

Video Graphics Array. Graphics standard introduced by IBM, having a resolution of 640 x 480 pixels.

VPN

Virtual Private Network.

WAP

Wireless Application Protocol. Handheld devices, low bandwidth, binary coded, a deck/card metaphor to specify a service. A card is typically a unit of interaction with the user, that is, either presentation of information or request for information from the user. A collection of cards is called a deck, which usually constitutes a service.

WAV

Waveform audio. Format for storing sound.

WBXML

Wireless Binary Extensible Markup Language.

WIM

Wireless Identity Module.

WML

Wireless Markup Language. A markup language used for authoring services, fulfilling the same purpose as HyperText Markup Language (HTML) does on the World Wide Web (WWW). In contrast to HTML, WML is designed to fit small handheld devices.

WTLS

Wireless Transport Layer Security. Part of WAP, WTLS provides privacy, data integrity and authentication on transport layer level between two applications.

WWW

World Wide Web.

xHTML

Extensible Hypertext Markup Language

XML

Extensible Markup Language

Related Information

Links

http://www.sonyericsson.com/	Product information and support available once P800 is launched.
http://www.ericsson.com/mobilityworld/	Information for application developers
http://www.ericsson.com/gprs	Information on the GPRS system
http://www.gsmworld.com/	General information on GSM
http://www.3gpp.org/	Home of the 3 rd Generation Partnership Project
http://www.etsi.org/	Home of the European Telecommunications Standards Institute.
http://www.mobileapplicationsinitiative.com/	Ericsson-sponsored initiative for development and promotion of GPRS enables mobile internet applications
http://www.ericsson.com/mms/demo	Information on MMS and a demo
http://www.mobiletransaction.org/	MeT – Mobile electronic Transaction homepage
http://www.symbian.com/	Information on Symbian and Symbian OS
http://www.syncml.org/	SyncML homepage
http://www.bluetooth.com/	Home of the Bluetooth Special Interest Group
http://www.irda.org/	Home of the Infrared Data Association
http://www.wapforum.com/	Home of the WAP forum
http://www.imc.org/	Home of the Internet Mail Consortium
http://www.rsasecurity.com/	RSA Security provides the SecurID [®] two-factor authentication solution.
http://www.securecomputing.com/	Secure Computing provides the SafeWord [™] authentication and access control solution.
http://www.vasco.com/	Vasco provides the Digipass security solution.
http://java.sun.com/	The source for Java technology.

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Technical Specifications

General

Product name	P800 (Standard version, latin character set) / P802 (Chinese version)		
Size	117 x 59 x 27 mm		
Weight	158 grams with battery and flip 148 grams with battery, flip removed.		
System and power class	E-GSM 900	Class 4	
	GSM 1800	Class 1	
	GSM 1900	Class 1	
Antenna	Built in		
Speech Coding	HR, FR, EFR supported where available, for high speech quality.		
SIM Card	Small plug-in card, 3V or 5V type		
Operating System	Symbian OS v7.0 Based on the 'UIQ' design.		
Processor	ARM 9		
User storage	For settings, user data (e.g. images, contacts, messages) and third party applications: P800: 12Mbyte P802: 9Mbyte (dictionary not activated)		

Battery Life

Standard battery	Talk Time:	up to 13 hours
	Standby time:	up to 400 hours

GPRS Maximum Data Rates (kbps)

		CS-1 9.05kbps	CS-2 13.4kbps	CS-3 15.6kbps	CS-4 21.4kbps
4 +	Rx	36.2	53.6	62.4	85.6
1	Tx	9.05	13.4	15.6	21.4

Speed achieved depends on the Coding Scheme supported by the GSM Network.

HSCSD Maximum Data Rates (kbps)

		9.6kbps per timeslot	14.4kbps per timeslot
2 +	Rx	19.2	28.8
1	Tx	9.6	14.4

Screen

Display type	TFT		
Display size	Flip closed:	208 x 144 pixels, 40 x 28 mm	
	Flip open:	208 x 320 pixels, 40 x 61 mm	
Pixel size	0.192 mm		
Colour resolution	12-bit (4096 colours)		
Screen surface	Touch-sensitive, anti-reflective		
Illumination	Front-light		

Keypad

16 hard plastic keys on hinged/removable flip
 Jog Dial, 4-way (up, down, towards, away) + select.
 Browser button to switch to integrated browser
 CommuniCam button – switches to camera viewfinder and acts as shutter.
 On-Off button

Input

	P800 (Standard version)	P802 (Chinese version)
Flip Closed	Numeric keypad on flip Latin characters on number keys	Numeric keypad on flap Stroke Pinyin Bopomofo
Flip Open	Touch-screen Natural character recognition On-screen virtual keyboard	Touch-screen Chinese character recognition English character recognition Numeric character recognition Stroke Pinyin Bopomofo

MMI Languages

	P800 (Standard version)	P802 (Chinese version)
Languages loaded; unwanted languages are deleted upon initialisation to free user storage space.	Danish (DA), Dutch (NL), English UK, English US, Finnish (FI), French (FR), German (DE), Greek (EL), Italian (IT), Latin American English (R1), Norwegian (NO), Portuguese (PT), Spanish (ES), Swedish (SV), Turkish (TR)	Chinese (Simplified, ZS) Chinese (Traditional, ZT) Chinese (Hong Kong, ZH) English UK

Third Party Application Support

SDKs	C++ PersonalJava™ J2ME CLDC 1.0 / MIDP
Load formats	C++ or Java™ applications in Symbian SIS format. MIDP installation (JAR/JAD) from Browser or connected PC
Security	Support for signed applications

Telephony

Handsfree options:	Built-in Office Speakerphone Portable Handsfree Bluetooth Headset (optional accessory) Stereo Headset (optional accessory)
Picture Phone Book	Picture of contact displayed when making outgoing call Picture of caller displayed when incoming call CLI matches entry in Contacts
Personal ringtones	Sound clips as personal ringtones.
Voice control	Voice Dialling Voice Answering Magic Word activation Up to 100 voice commands.
Other features:	Support for calling cards Access most applications whilst on a phone call Flight mode, enabling P800 to be used as a PDA in locations where radio transmitters must be switched off. GSM and Bluetooth are switched off when in flight mode.
SIM-AT	SIM Application Toolkit according to GSM 11.14
USSD	Incoming and outgoing

Personal Organiser

Applications	Contacts (Address Book) Calendar (Diary) Tasks ('To-Do' list) Jotter (Text and 'ink' notes) Voice Memo (Dictaphone) World Clock Calculator (P802 only) English-Chinese-English Dictionary (P802 only) Lunar Calendar
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Integrated CommuniCam

Image Size	640 x 480 pixels (VGA) 320 x 240 pixels (QVGA) 160 x 120 pixels (QQVGA)
Colour depth	24 bit (16.78 million colours)
Storage format	JPEG/JFIF, 3 quality (compression) levels, user-selectable.
Other features	Delay timer Brightness and Contrast settings White Balance (4 pre-set values plus automatic) Flicker-free setting (for fluorescent lighting) Backlight mode (when there is light behind the subject) CommuniCam button switches to viewfinder and acts as the shutter.

Image Viewer

Formats	JPEG, BMP, GIF, MBM, PNG, WBMP
Sharing via	IR, Bluetooth, MMS, E-Mail, PC file transfer

Image Editor

Usage	The Image Editor is available when composing MMS messages.
Functions	Crop, Rotate, Rescale
Electronic ink (draw on picture)	Colour, pen size, eraser function

Video Player

File Format	.MP4 (MPEG4)
Streaming transport	RTSP according to 3GPP
Video coding	MPEG-4 Simple Visual Profile Level 0 H263 Profile 0 Level 10 H263 Profile 3 Level 10
Audio coding	AMR; AAC

Messaging: SMS

Classes	0, 1 and 2
Bearer	GSM and GPRS
Broadcast	Basic & Extended channel
Concatenated	up to 255 messages

Messaging: EMS

Standards compliance	3GPP 23.040 Version 4
Supported objects	Sounds, Melodies, Pictures, Animations
Image editor	User may create and edit icons (16x16 and 32x32 pixels)

Messaging: MMS

Image formats	GIF, JPG, BMP, WBMP, PNG
Audio format	AMR, WAV, iMelody
Presentation	SMIL
Conformance	3GPP 23.140 V5.0 Nokia/Ericsson 'MMS Conformance Document V2.0.0'

Messaging: E-Mail

Incoming mail server support	POP3, IMAP4
Outgoing mail server support	SMTP
Content coding	MIME compliant
Attachment Viewers	VCard, vCal, Document viewers as below
Other features	Automatic download of messages over GPRS 'always on' connection

Document Viewers

On-board	Microsoft® Word Microsoft® Excel Microsoft® Powerpoint® Adobe® Acrobat® (PDF)
Supplied on CD-ROM	Over 20 further formats

Integrated browser technical data

Markup Languages	HTML 3.2 (excluding features not relevant to a small screen device) WML 1.2.1 WBXML xHTML Basic xHTML Mobile Profile cHTML
WAP version	2.0
Scripting	Compiled WML scripts
Style sheets	WCSS
Images	WBMP, GIF (including animated), JPEG
Bearer	GPRS, HSCSD, CSD
Security	WTLS Class 1, 2, 3 TLS/SSL
Certificates	Pre-install & download WTLS, X509
WIM	WIM interface including SIM-WIM (SWIM)
Bookmarks	Yes, number only limited by available user storage
Bookmark import/export	IrDA, Bluetooth, SMS, MMS, E-Mail
Home Page	Yes
Cache	15 – 120kbyte user-configurable; 30kbyte default.
Clear cache function	Yes
Hyperlinks	<u>Underlined</u> in text Image according to Style Sheet.
WAP Accounts (WAP Profiles)	Yes. Integrated with bookmarks. Quantity only limited by available user storage.
OTA Support	Ericsson/Nokia OTA WAP Forum Provisioning

M-Services

Compliant with M-Services specification, Phase 1

MeT

Compliant with MeT specification, version 1.0

User Customisation

Wallpaper FC only	JPEG, GIF, BMP, WBMP 208 x 320 pixels wallpaper image size 208 x 144 pixels visible area with flip closed.
Screen saver FC and FO	JPEG, GIF, BMP, WBMP Animated GIF supported; note that animation uses more power. 208 x 320 pixels FO image size 208 x 144 pixels visible area with flip closed (same image as FO)
Ringtones Alarm tones	iMelody WAV, AU, AMR. Recommended format for WAV files is PCM, 22,050Hz, 8 bit, Mono, often called 'radio quality'
Application selection	Application available via FC on-screen icons. Applications available from Application Picker in FO mode.

Bluetooth Wireless Technology technical data

<i>Bluetooth</i> compatibility statement	This product is manufactured to comply with the Bluetooth specification 1.1.
Coverage area	Up to 10 metres (33 feet)
<i>Bluetooth</i> functions	Generic Access Profile Serial Port Profile Generic Object Exchange Profile Dialup Networking Profile Object Push Profile Headset Profile

Infrared Transceiver technical data

Data transmission rate	Max speed between phone and IrDA device (e.g. PC, another phone) SIR: up to 115,200 bps
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Remote Synchronisation

Data	Contacts Calendar Tasks
Bearer	HTTP
Protocol	SyncML

Local Synchronisation

Data	Contacts Calendar Tasks Jotter Text Notes E-Mail
Bearer	Bluetooth IrDA USB
Protocol	SyncML
PC Applications supported	Lotus Organizer 5 & 6 Lotus Notes 4.6 & 5.0 Microsoft® Outlook® 98, 2000, 2002

PC Connectivity Solutions

Drag-and-drop file transfer between the P800 and the PC. (e.g. Word documents, JPEG images)
Backup and Restore of user data and settings
Load new application
Change MMI Language
Use P800 as wireless modem.

Security

Data protection	SIM PIN (at power on) Device Lock (at power on and/or activated by screensaver)
Browser	TLS, SSL, WTLS, Certificate handling
Third party applications	Support for signed applications
Intranet Access	SecureID [®] from RSA Security SafeWord from Secure Computing DigiPass from Vasco

Remote Configuration

Ericsson/Nokia OTA Settings specification	WAP Account (Account name and WAP Gateway information) ISP Settings (Bearer information, username, password) Bookmark (name and URL) SyncML settings MMS Settings
WAP Forum specifications	WAP Account ISP Settings Bookmarks
Smart Messaging Specification	ISP Settings E-Mail account

Location Based Services

Mobile-assisted E-OTD positioning according to FCC E-911 Phase 2
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